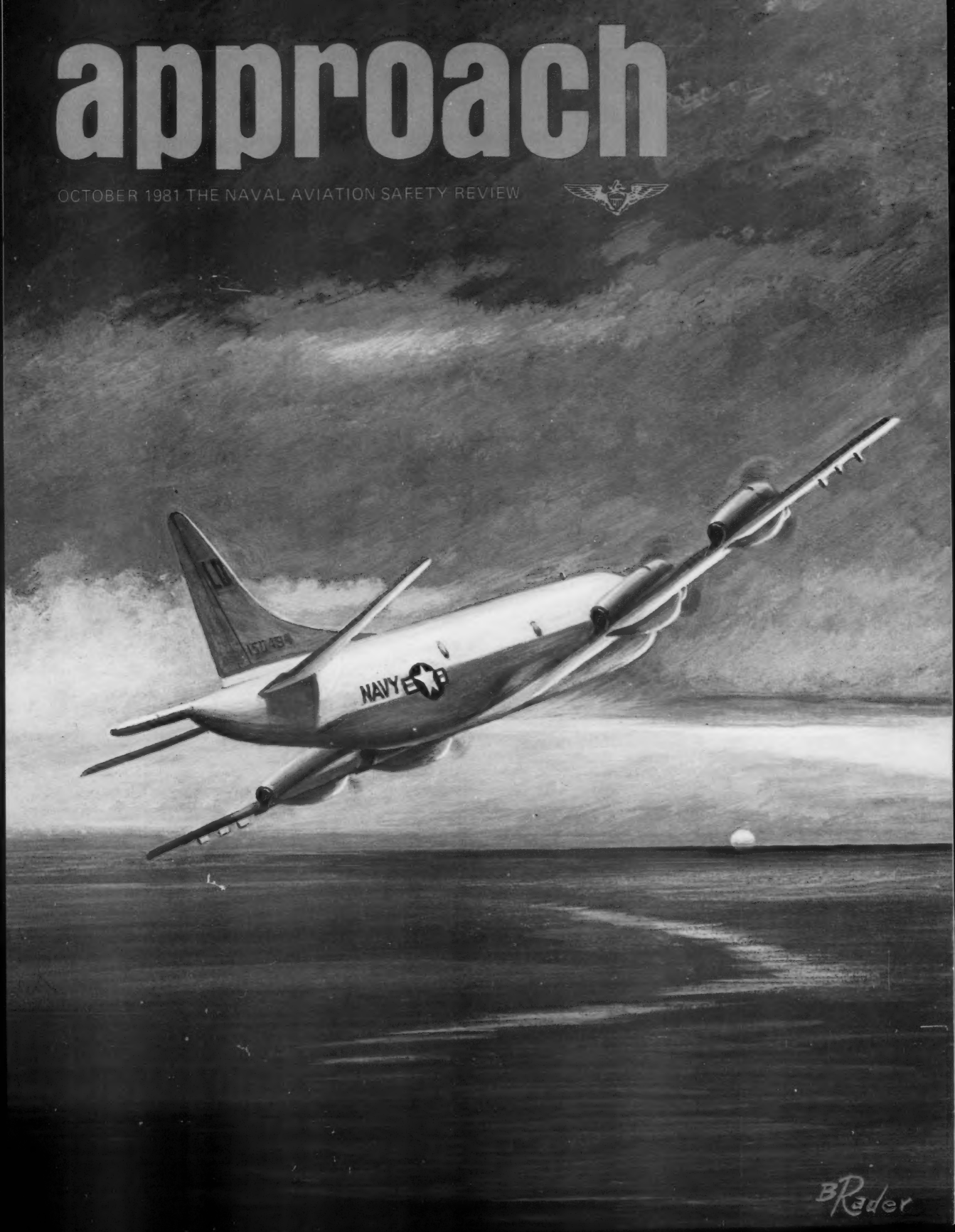
approach

OCTOBER 1981 THE NAVAL AVIATION SAFETY REVIEW



Implications

I read an article by a flight surgeon the other day. It contained some useful but not new advice for aviators — "Ground yourself if you don't feel you can safely fly, either for physical or psychological reasons." This advice was born of wisdom. In peacetime, and with no dire circumstances dictating otherwise, why would you want someone to fly your aircraft if he felt he couldn't handle it?

Then I remembered the first time I followed this guidance. I was fairly new in the squadron and had an unarguably good reason not to fly one day. When I went to see the schedules officer, he was very understanding and said, "No problem. Just put your name and the date here in the Snivel Log." The **SNIVEL LOG!!** Images of a beady-eyed, parasitic troll slithering around the squadron appeared in my head. A **sniveler** — what a title! I could see the department heads passing the book between themselves at fitness report time.

I hesitantly scrawled my name on the page and disappeared. No matter how nice the schedules officer was and regardless of whether or not it was intended, the implication was clear — "We have a little book for no-loads like you. It's called the Snivel Log."

I am pleased to say it didn't take long to find out my fears and fantasies were ill founded.

A trivial example? Quite possibly. But how many other of our safety policies, programs, or practices are perceived to have negative stigmas attached to their use?

We in naval aviation have some of the finest safety programs possible. They are reasonable and efficient systems developed to ensure our health and longevity. Let's make sure they're as effective in practice as they are in theory!

LT Dale Smith

Vol. 27 No. 4

approach

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As we near the end of 1981 and look forward to improving the Mishap Rate in 1982, one task is to review our past year's experiences. One area that leaps off the computer runs is that of out-of-control mishaps. While searching for the best article to address this problem, the following article came up in discussion. The article was first printed in the December 1969 issue of *TAC ATTACK* and later run in the March 1970 issue of *APPROACH*. It was written by Tony LeVier, one of the world's leading test pilots. Despite its age, the article is still one of the best dissertations on out-of-control flight we've seen.

The Thing

By A. W. (Tony) LeVier
Lockheed-California Company
Courtesy of *TAC ATTACK*

THE five little racers are lined up abreast for a race horse start, barely 20 feet between wingtips. It's the start of the Greve Trophy Race during the 1939 National Air Races in Cleveland, Ohio.

I'm flying the Schoenfeldt Firecracker, the world's fastest 550-cubic-inch racer, and I'm sitting at the enviable lift end (pole) position. Lee Williams, a novice, is on my right. Further on are Art Chester, Harry Crosby, and George Bayrs, in that order. We are headed south on the grass turf of the municipal airport. The No. 1 scatter pylon is slightly to my right and No. 2 is well to the left.

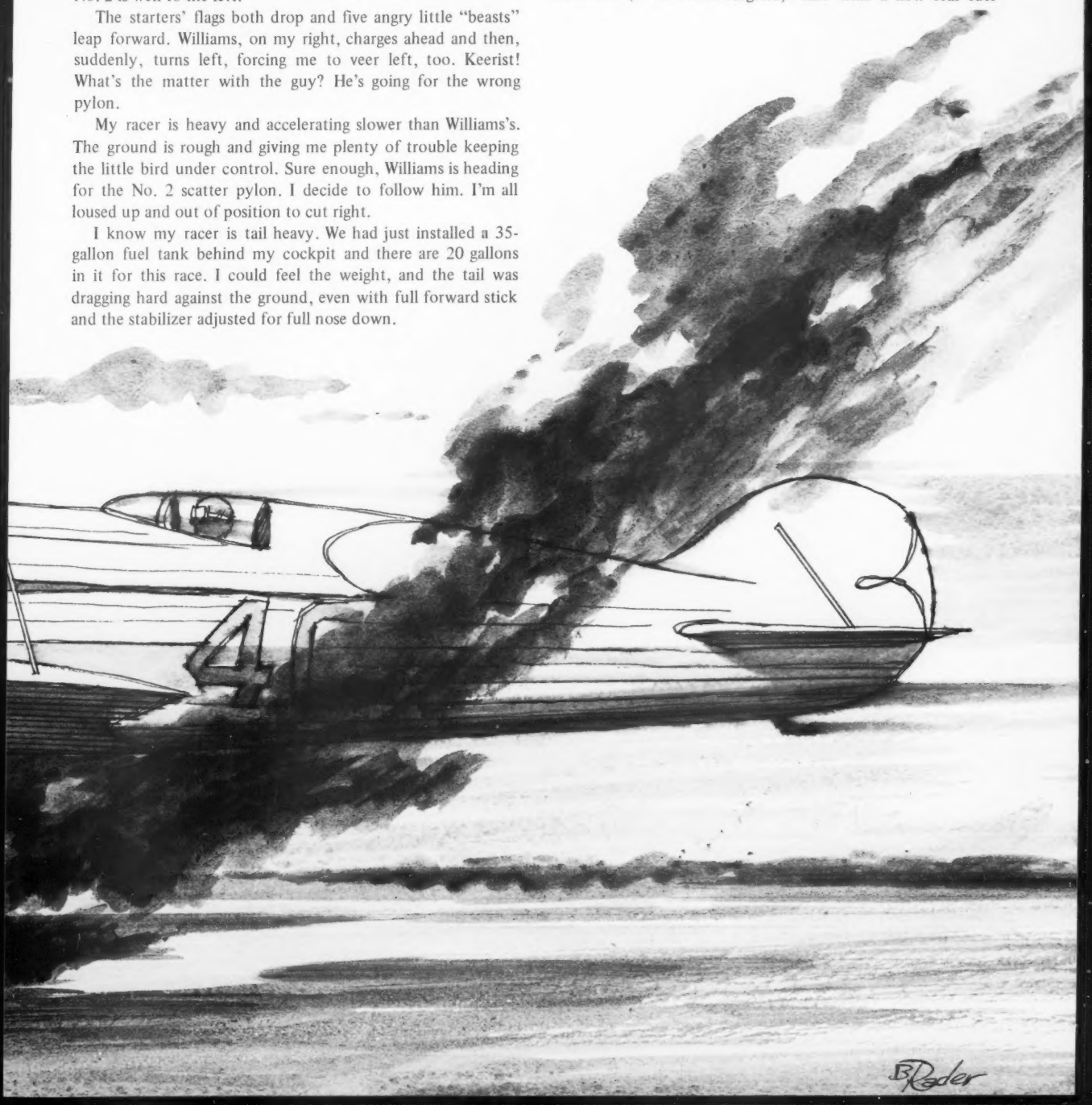
The starters' flags both drop and five angry little "beasts" leap forward. Williams, on my right, charges ahead and then, suddenly, turns left, forcing me to veer left, too. Keerist! What's the matter with the guy? He's going for the wrong pylon.

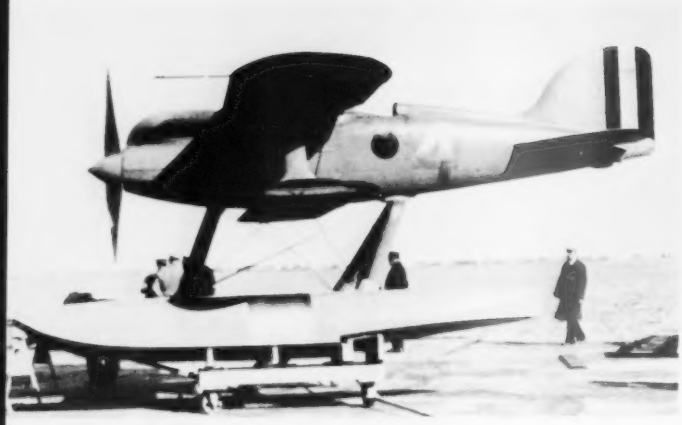
My racer is heavy and accelerating slower than Williams's. The ground is rough and giving me plenty of trouble keeping the little bird under control. Sure enough, Williams is heading for the No. 2 scatter pylon. I decide to follow him. I'm all loused up and out of position to cut right.

I know my racer is tail heavy. We had just installed a 35-gallon fuel tank behind my cockpit and there are 20 gallons in it for this race. I could feel the weight, and the tail was dragging hard against the ground, even with full forward stick and the stabilizer adjusted for full nose down.

Williams is in the air. His takeoff looked hairy. With the nose dangerously high he catches it, then straightens out toward the No. 2 scatter pylon. I follow him into the air. Ye gads! Is she unstable. Every little bump makes her want to pitch-up or tuck under. I was expecting this to happen, knowing full well that the CG (center of gravity) was aft of the normal limit.

I started a wide left turn to follow Williams. He's just about to the pylon. Now he starts rolling into the turn. He's almost vertical and pulling back on the stick. Then it happens. The little racer, "Miss Los Angeles," also with a new rear fuel





Lockheed

tank, pitches and snaps. Williams, the poor guy, in his haste and excitement, hadn't gotten the warning or just didn't understand what a rear CG meant. The racer, tumbling crazily, falls to the ground. I am directly over him when he crashes. God! What a start for an air race.

I circle on around to the left, as the rest of the racers pass around both scatter pylons. I eventually catch up and pass the other fellows, only to have my engine go sour, forcing me out of the race.

Even though I was out of the money, I learned a valuable lesson that day. All high-performance aircraft can, and do, perform maneuvers that result in out-of-control situations. The fighter pilots of today are faced with out-of-control maneuvers that can only be described as *"The Thing."*

Now, really, there isn't much difference in the way some of those early-day racing aircraft acted and our present day fighters. Today, the words "pitch-up," "pitch-down," "tuck under," and "poststall gyrations" are spoken by jet fighter pilots. Is this a whole new terminology for aircraft behavior? Not at all. The basic behavior phenomena of aircraft hasn't changed at all throughout my years of flying.

Take these "new terms": super stall or deep stall. I used to call it *catastrophic stability* in order to describe it. Anyway, I experienced it in 1933 during practice for an airshow. I was going to do a series of dead stick loops. On my first attempt, the bird stalled inverted, and believe it or not, it wanted to stay inverted. I used every combination of control to get her off her back, but to no avail. The aircraft, an OX5 powered Travelaire biplane, was falling flat and absolutely so stable that it would have crashed inverted had I not hit turbulent air at about 1,000 feet. This upset the machine just enough for it to slide off on one wing. I was about to bail out at just that moment.

The only difference between those "early birds" and some of our very latest and hottest fighters is that they were lightweight and slow in speed. Generally speaking you could get away with making a lot of mistakes simply because you had a little more time to correct yourself. Even if a particular type of aircraft would snap at you for mishandling, you could recover by certain corrective action almost instantaneously.

Not so today. Our fighters, big and little, all have high wing loadings of over 100 psf (pounds per square foot). And I think I'm correct in saying that none of them have a really clean bill of health when it comes to slow speed stability and control. That's what I would like to talk about now.

Slow Speed Stability and Control

By and large, we pilots tend to get into more trouble with an aircraft by fooling around at low speed and too low an altitude while executing some special maneuver. Often this pet maneuver is *verboten* by either the NATOPS manual or the SOP set forth by the particular command to which you are attached.

Also, and it's not exactly rare, some odd characteristics of new aircraft are not completely understood by everyone until such time as an accident investigation reveals the flaw. Sometimes it takes a lot of pilot and aircraft losses to jar people loose to do something about it. In the meantime, "pilot

factor" is only too often the final conclusion of an accident investigation report. I'm talking, of course, of those accidents that usually happen during seemingly normal circumstances . . . the pilot landed short, the aircraft stalled on base leg, etc., with everything else working OK.

Surprisingly enough, our skill levels are not always what they should be at any given time. Therefore, in my opinion, and this is strictly from my personal observation from working with all kinds of pilots, military and civilian, for 40-odd years, there is a percentage in any group who will overextend themselves. From time to time they deviate from the standard and laugh about it . . . only if they get away with it. The helluvit is, frequently there's no one left to laugh.

Several years ago a young ex-military pilot joined our ranks as a production test pilot. He was a darn good pilot, had an aeronautical engineering degree and wanted to be an experimental test pilot. We sent him to a military test pilot school where he distinguished himself as an outstanding graduate. Later on, he had his chance to join the engineering department as a full-fledged experimental test pilot. Again, he distinguished himself by performing important development testing on the world's first Mach 2 fighter.

He and I spent his last evening together, talking about his work. There were many things that bore on his mind. He once told me that he had never been frightened while flying an aircraft. Perhaps he hadn't, but it appeared to me that evening that test flying was getting to him. "Joe," I said, "there are times when we all have to back away from our work to assess ourselves and the tasks at hand. If your job is getting on your nerves, you may need a rest . . . need to get away from it for awhile."

There was work to be done and Joe was the last person to throw in the towel or to ask for time off. It was late afternoon the next day when he approached Runway 07 at Palmdale. Witnesses stated that the aircraft looked normal until about 15 feet off the ground. Suddenly the right wing dropped some 15 to 20 degrees. At that moment, the nose came up and the bank angle increased. Now the plane started to veer to the right and headed off the runway. Joe put in full power and afterburner to try and save the situation. The bank angle increased to about 70 degrees with the nose high. Then it struck the ground. The right outboard tip tank fin cleaved the ground first. The angle was measured at 70 degrees.

Joe was really a wonderful guy. Unusual for our day. He didn't drink, smoke, swear, or raise hell like a lot of us do. His family life was very harmonious. But even with all these plus factors working for him, he still made one little mistake that day.

The particular aircraft he was flying did not yet have boundary layer air for the landing flaps. Therefore, all landings were to be made in takeoff flap position. For some unknown reason, Joe elected to use landing flaps. I had previously done the early investigation of the landing flap configuration and found that as you approached touchdown speed, the right wing dropped – not abruptly, just gradually. It seemed to sneak up on you. This was basically caused by span-wise airflow over the ailerons which rendered them ineffective just at the time you needed them most.

The accident investigation board did their job. No one could ascertain what happened. I recounted my experience with the bird during earlier tests, but they refused to accept it. Findings: Cause Undetermined. They just weren't listening.

Now, let's talk about another so-called new terminology – poststall gyrations. As time goes by, more and more pilots in various fighter aircraft are encountering these out-of-control maneuvers. The NATOPS manual might mention them with a WARNING or CAUTION and touch on the subject briefly, but you might conclude it to be of little significance.

Later on, when the service pilots get the bird and really put it through its paces, invariably someone, perhaps less experienced and not too long out of flight school, gets into trouble. Things get to popping. So what happens? Meetings are held and a Safety Advisory is issued.

I have had many hairy experiences during the early development of jet aircraft. Some of these birds had poststall gyrations like nothing you can imagine. Those of you who are relatively new to our jet-set and didn't fly the good old T-Bird (T-33) back in its early days might not know that it had a PSG (poststall gyration) that we called *"The Thing."*

Fighter Design

In order to design a modern fighter aircraft with Mach 2 plus capabilities, the designer must consider many things in determining the configuration he believes best to meet the military requirements. Usually the customer specifies the desired gross weight, payload, range, speed, operating altitude, and related equipment to complete a weapon system. The manufacturer chosen as the prime contractor assembles his staff for the project. They, in turn, start the task of refining the design already proposed. What will it look like? Will it be a

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delta, swept, or short, thin, straight wing? High or low tail plane? Take your pick, we have 'em all.

Wind tunnel tests are used to optimize the design. Invariably, some undesirable characteristics rear up to bug the aerodynamicists. They make trade-offs here and there to try and improve the situation only to find that they adversely affected some other good characteristic. It takes a smart and patient engineering group to finally find a solution that will produce an aircraft acceptable to the customer.

However, and you must remember this, the trade-offs that are made in the final design of a supersonic fighter, in the cases I know of, have resulted in marginal low speed stability and control at high angles of attack. And, they all have some sort of undesirable handling characteristics during and after accelerated stalls.

At traffic pattern speeds and altitudes, an accelerated stall most often will result in a PSG from which recovery will be extremely doubtful. When the modern fighter is man-handled into an abrupt pitch attitude of high angle of attack, several things happen almost simultaneously . . . and so fast that I defy any normal pilot to react quick enough to divert a wild ride.

Take a typical fighter, sweptwing, low horizontal tail, normal weight and CG. If the pilot, on the break for a landing, rolls and then racks it back to make an impressively tight turn, the airflow over the wings changes abruptly from chordwise flow to span-wise flow on the underside and "burble" or flow separation on the top side. *Unless careful wing design prevails,* tip stall will occur, which produces a forward shift in the CP (aerodynamic center of pressure). This, in turn, produces an extremely severe stalling moment (pitch-up). With a fast pitching rate, produced first by the pilot, plus the forward shift in CP, the angle of attack easily exceeds normal limits. The suddenness of the initial maneuver will usually mask or shadow any normal or artificial stall warning.

If incipient stall occurs, the aircraft may roll right or left. Roll application by the pilot may help trigger this condition, which can induce adverse yaw followed by *autorotation.* Under certain conditions one might expect a snap-roll ending up in a spin.

On the other hand, the long body (fuselage) and tail surfaces play an important part. When the wing stalls at the root, it will affect the airflow along the aft fuselage, which also reduces the aircraft's directional stability. The vertical fin, now engulfed in a region of turbulence, can be partially stalled, reducing the directional stability still more.

Now, the forward body of the fuselage comes into play. It's there to carry the flight crew, some incidental equipment, and usually sticks way out in front. It makes most aircraft look real racy. Right now it would be better to have a short forward body. The long forward body wants to bend back. It may tend to pitch the nose still higher if the wings are level, or yaw the aircraft to excessive angles if the airplane has rolled into a vertical bank attitude. The airflow produced by high angles of fuselage body will tend to aggravate the flow of air across the aft fuselage and tail surfaces.

The sequence I have described takes place in about 1½ seconds at approach speeds. PSG is now in effect. You are going for one heck of a ride, like it or not. The speed of the aircraft drops so fast by virtue of the tremendous induced drag that you will feel like you've been kicked in the face. There is, in my opinion, about a 50/50 chance for recovery under 10,000 feet above ground level in most supersonic fighter aircraft – and that's cutting it mighty close. These gyrations may even flame out the engine, which certainly compounds your problem. At traffic pattern altitude, you had better punch out pronto!

Let me tell you what happens with an F-104 in a high-speed pitch-up. The actions of the *Starfighter* can be compared to the maneuvers I went through when the turbine wheel let go on an early P-80 test flight and cut the whole damn tail off! You can imagine the resultant gyrations.

I was selected to be the project test pilot for the first flight of the XF-104 and subsequent Phase I development. The phenomenon of negative static longitudinal stability at high angles of attack had been detected in wind tunnel tests. It was given the name "pitch-up," but little was known of it at that time. The solution to this would only be resolved later during flight tests. I was informed of the characteristic, although no one was sure what the bird would end up doing. I, obviously, approached all stalls with great caution.

In the 1G level stall tests, I encountered the point of neutral static longitudinal stability. As I cautiously continued to pull the stick back (about 145 knots) the bird would just sit there, nose high on the horizon, buffeting like crazy. Suddenly, lateral instability set in and caused the bird to flop so fast I couldn't keep up with it. I shoved the stick against the forward stops and the aircraft still wouldn't respond. I had found the neutral point and then exceeded it by a very small margin so that the aircraft was becoming divergently unstable. I was on the verge of pitching up. If a pilot were to make a rapid pull or jerk, he could easily go through the neutral stability point and get into an uncontrollable pitch-up maneuver.

I didn't lose complete control during those 1G tests – just almost. The thing I did notice, though, was that as I pulled back on the stick gradually to reduce speed and reached a fairly high angle of attack, the aircraft began buffeting quite severely. The stick force, of course, was high because of artificial feel force springs. This produced a false impression that shadows the somewhat sudden change in longitudinal static margin at the critical angle of attack. At the time, we did not have an APC (automatic pitch control) system.

Later on we started doing what we called "V-G test" . . . how many G the bird would produce at a given indicated airspeed (Vi)! This particular test called for 30,000 feet, Mach 0.9, not to exceed 325 knots Vi (for safety considerations).

Test 1: Trim for 1G flight, then pull a steady 1½G in a turn to study stability, control, and buffet onset,

if any. There was no buffet.

Test 2: Pull 2½G. This produced light buffet, no appreciable change in stability or control.

Test 3: Pull 3½G. This produced very heavy buffeting and lateral oscillations that I could hardly keep up with. I was holding 3½G steady for about one complete turn when, all of a sudden, the bird pitched and rotated so fast and so violently I thought the tail had parted company.

This reminded me of the P-80 turbine failure incident which I mentioned before. I thought of four things and acted on the fourth. The tail broke off . . . I've got to eject . . . I have the stick in my hand . . . I pushed it forward and the aircraft straightened out and flew off as though nothing had happened.

I was somewhat shook. My chase pilot failed to see the maneuver. I requested a visual inspection but he could find nothing wrong with my aircraft. Everything seemed normal in the cockpit. Even so, I discontinued any further testing. This may well have been the first pitch-up maneuver and successful recovery of a supersonic fighter.

I made my report. Both Lockheed and the Air Force thought only a "stick shaker" was necessary. Besides, they reasoned, the natural aerodynamic buffet and lateral oscillations were a very strong and effective warning system. Most people at the time didn't appreciate this new phenomenon until another fighter pitched up on takeoff and crashed. This brought everyone's attention to the phenomenon of pitch-up and poststall gyrations. As a result, an APC system was installed.

Now, the sad part of modern-day flying is this: pilots can't experience these strange happenings because they are forbidden. Read any NATOPS manual and it *warns* you about slow speed flight, or to avoid a deep stall, and that spins are prohibited. Only by accident are you allowed to experience them. Some make it, some don't.

A couple of years ago, a fighter pilot trainee made a weapons delivery pass on an Air Force range. On the pullup he went into a crazy gyration and crashed. The pilot ejected only to smack the ground before his chute worked. The base commander and operations personnel tagged it as a flight control problem. Why would an aircraft do such a wild maneuver unless the flight controls suddenly went ape? It was a natural thing for them to think.

I thought differently. The bird had a clean bill of health with the hydraulic flight control system. I suspected pitch-up. I visited the air base and talked to the accident investigation board. I found out that this unit was flying at low altitude with the APC inoperative because they had experienced several malfunctions. The system was giving them stick kicks during low-level pullouts. They hadn't lost an aircraft due to their APC malfunctions, but now they chose to expose every aircraft and pilot to possible pitch-up at low altitude during the pullout on gunnery range training.

We showed them motion pictures of pitch-up. One of the range witnesses said, "That's it, that's what the bird did." There was still some doubt in their minds, but the final report came out . . . probable cause: pitch-up.

In summing up the situation as I see it . . . the loss of aircraft due to *"The Thing"* can be reduced very drastically by two steps.

1. Every pilot flying supersonic fighters must be made aware of what poststall gyrations are, what causes them, and how to avoid them, particularly at low altitude where recovery is unlikely. At normal traffic pattern altitudes and during takeoffs, approaches, and landings, *you must learn to handle the birds with kid gloves.* There is no requirement for aerobatics in the traffic pattern. *(Amen!! – Ed.)*

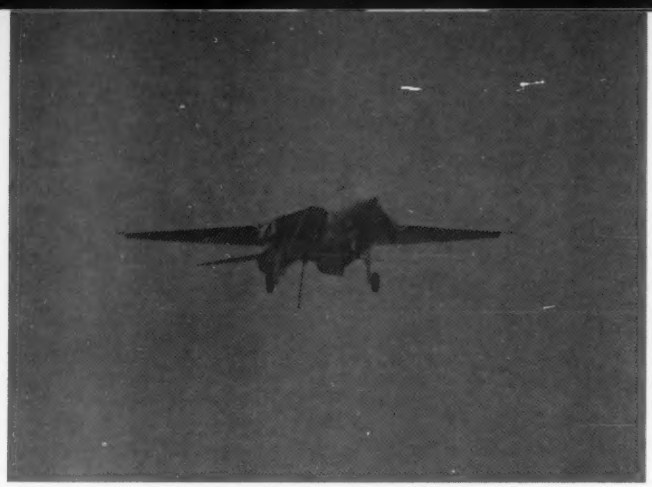
2. Any supersonic aircraft having undesirable low speed stability and control characteristics wherein, at high angles of attack, the static margins become neutral or negative about any of the three axes, I strongly recommend an APC system to preclude any possible chance of a pilot encountering an uncontrolled stall maneuver . . . *"The Thing."*

I believe the young officers of our military air forces of today are as fine a group of young men as I have ever had the pleasure of meeting. There's really little difference, that I can see, from pilots of 25 to 30 years ago. But now we have extremely expensive, high-performance aircraft. Mission requirements are more demanding than ever before, requiring far greater attention to every detail of flight operations. Today's pilots, as a whole, are better educated.

Many years ago I recognized the need of pilot support for the worldwide F-104 program. I convinced our management to send out our best qualified pilots and engineers on company-funded trips to assist the units in all phases of their operations. We printed books that contained lectures explaining all the whys and wherefores of the warnings and cautions in the handbook. We explained to all the pilots how we arrived at all the limitations on the *Starfighter.* This support program is still being funded and I'm convinced it's paid off in a big way for us and our customers.

For all you eager young pilots who are just beginning, I want to advise you to think ahead to the time when you'll have bags of experience in your fighter bird and be confident that you can lick anything in the skies. Until then, look at yourself; size yourself up. Don't kid yourself on how good you are – prove it by playing the game straight. Go by the rules or you go alone.

And watch out for *"The Thing"!* ◄



EMCON roulette

By LCDR Skip Fincher, USN
VAQ-133

BACK in my formative years in naval aviation, EMCON procedures were something to be studied for the ORE and then left in the TACPROs to collect dust. On my first sea tour, I remember only one night EMCON recovery, and that occurred at the end of the cruise. The only ones allowed to fly were all the old "pros," and it was only a one-time shot to check out the procedures and to provide something different to do at the end of the cruise. No one seriously considered ever using the procedures on a regular basis. Not so anymore! Consider a recent horror show, and you will get an idea of the importance placed on EMCON by battle group commanders.

The exercise seemed simple enough. The battle group was to search and locate an Allied small boy simulating an enemy surface-to-surface missile shooter. The ship's plan was to stay in EMCON to avoid detection and, at the same time, launch a massive SSC effort during the day, followed by a "War at Sea" strike to mop up our pesky little adversary. The problems began when *all the King's Horses* couldn't find the enemy before the sun went down. What's worse, there were 14 airplanes airborne that hadn't been properly briefed that this was going to be an EMCON recovery. The ship was in total EMCON, and an overzealous EWO had disabled all the ship's transmitters. The weather was well below the minimums specified in the TACPRO. In addition, someone forgot to blow the dust off the TACPRO and read the rule that only six airplanes were supposed to be airborne. Because of the size of the search area, however, many more aircraft were required. "Time to turn on the TACAN," you say, "and holler *Uncle*." Noooooo!

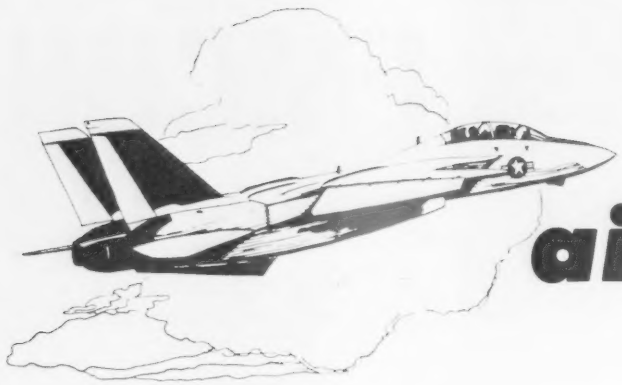
So it began. There was a deathly pall in CATCC, and the squadron representatives there were nervously exchanging glances, without saying a word. Everyone's eyes were glued to the PLAT, looking for the first aircraft. Airborne, it was obvious the E-2 was having difficulty. The picket ship's TACAN was not operating properly. Essentially, it was giving random radar vectors to everyone. Amazingly enough, four fuel-critical F-14s came and landed without a word. I say "fuel critical" because it was only after the crews debriefed that anybody learned their fuel states. Next, a *Prowler* came in and received a foul-deck waveoff. During the waveoff, the LSO discovered he couldn't transmit on his radio (don't forget the EWO). The *Prowler* was low state and requested priority and downwind instructions. To everyone's horror in CATCC, it was discovered that no one in CATCC could transmit on the radios, either.

The *Prowler* turned downwind on his own and, in difficult weather conditions, was finally able to pick a hole in the string of aircraft lined behind the ship. No one in CATCC had any idea of the fuel states or the recovery order of airborne aircraft. Everyone was required to fly at 800 feet to maintain VMC. Several near-midairs were reported by the aircraft. The situation was becoming chaotic. "Time to turn on the TACAN," you say. Noooo! Several requests went to the embarked staff to break EMCON. Negative replies were issued. Airborne, it became every man for himself.

Lady Luck then started to smile on everyone, and people began getting aboard. When the last aircraft was recovered, a large cheer went up in CATCC, and everyone began to wonder about the next recovery. Fortunately, an A-6 reported a visual identification of the target, and the decision was made to come out of EMCON. Unfortunately, the A-6 had identified the wrong combatant, and the real enemy was able to identify and locate the carrier because of electronic transmissions from the ship. The bottom line? We lost the war!

Now began the post-mortem. It was time to play "who shot John." What we had witnessed was certainly unsafe, and the old adage, "You fight like you practice," came through loud and clear. There were more than enough mistakes made by all concerned. But what was really upsetting was that the entire ship/air wing team had failed. The crews had not been properly briefed. The ship was not instantly able to come up and take control *when safety of flight was involved.* The prior planning needed for the entire evolution had not been done.

Since this incident, EMCON operations have become nearly commonplace. Hopefully, we've learned. But for those getting ready to come out here, learn from us. Practice those EMCON recoveries during workups. Think about it. When was the last time you went out and flew for 2 hours and came back for a night carrier landing without a TACAN or radio? ◄



air breaks

Almost Hosed. Following a night carrier launch, two KA-6D aircraft, Laser 101 and Laser 102, rendezvoused for a tanker checkout and consolidation. Checkout was accomplished at 10,000 feet due to the overcast weather below. Normal tanking procedures were followed with 101 taking 300 pounds of fuel from 102.

10 Upon completion of the fuel transfer, 101 began backing out, but the drogue remained attached to the inflight refueling probe and the entire length of reel hose separated from 102 and draped down the port side of 101. Fuel was ingested into the port intake of 101, and a bright flash was seen by the crew on the port side of the aircraft. A decay in RPM immediately followed.

Emergency calls were made to the carrier and 102 rendezvoused with 101 to make a visual inspection of that aircraft. Both engines on 101 were functioning properly. Laser 102 reported that the hose, wrapped around the port wing of 101, trailed back to the horizontal stabilizer. At this point, both aircraft were diverted to the nearest NAS so 101 could make an emergency landing there.

During transit, 101 began dumping fuel from the wings. When the aircraft were about 5 nm from the NAS, 101 secured fuel dumping with a total fuel weight of 10,000 pounds onboard. The pilot of 101 then slow-flight tested the aircraft in a no-flap/no-slat configuration to check for hose entanglement of the flaps or slats. **No further cockpit landing checks were made** (the importance of this omission is discussed at the end of this article).

Landing airspeed was established at 165-170 KIAS, and Laser 101 commenced a straight-in to the duty runway for a shortfield arrested landing. The first pass resulted in a bolter, and the pilot noticed the hose was still dangling from the aircraft. A second approach was made, and again 101 boltered, but the crew decided to remain on the runway. Laser 101 engaged the longfield gear at about 50 KIAS. Both brakes were on fire, and flames were shooting from the port side of the aircraft. The pilot shut down both engines, and the crew exited the aircraft from the starboard side. The crash crew quickly extinguished the fires with no further damage to the aircraft. The hose was gone and believed lost on the last downwind pass. Laser 102, which had remained overhead until 101 was on deck, returned to the carrier and made an uneventful landing.

The squadron CO's comments on this emergency follow: "Both crews are to be commended for their immediate response to the hose failure and their decision to divert to the NAS. However, the crew of Laser 101 had a significant potential for an aircraft mishap during the landing phase when they neglected to take the time to go over all landing checklists and get the aircraft to a suitable fuel weight for a shortfield arrestment. They failed to use the speedbrakes, select antiskid, and arm the flaperon popup. The damage to 101 was not caused by the hose failure, but from the crew permitting an emergency situation to become compounded through haste and inexperience. The unfailing use of checklists and crew coordination cannot be stressed enough during emergency situations."

Amen!

Use the Lights. Upon final landing, an aircraft proceeded to taxi inbound following lighted taxiways. While turning onto another runway, which at night was used only as a taxiway, the aircraft struck an unlighted construction barricade, resulting in impact damage to the prop and limited damage to the engine and airframe. Several hazards were involved in this mishap:

The pilot allowed the copilot to taxi without using the landing lights. Local directives recommend their use for all night taxi operations but caution that discretion is necessary to avoid disorienting pilots in other aircraft.

The pilot failed to contact the

ground controller immediately after leaving the duty runway.

The civilian contractor overlooked his responsibility to ensure proper operation of the obstruction lighting. He failed to check and replace the dead batteries in the lights on the barricades.

Air operations personnel incorrectly assumed that the barricade lights were activated automatically by darkness. Since the NAS had the responsibility for all airfield lighting, any manual attempt by operations personnel to activate the obstruction lights would have detected the dead batteries.

Since the permanent tower was undergoing renovation, a portable tower was in use. The small size of this tower required the ground controller and clearance coordinator to man a booth on the ground below the portable tower. This position did not afford the ground controller visual coverage of the runway area undergoing construction. Because of this, the tower supervisor had established a system of advising any aircraft using a full runway rollout of the construction and modified taxi route. He had been doing this while aircraft were still on the duty runway, but his attention was diverted before he was able to caution the mishap aircraft.

The Automatic Terminal Information Service (ATIS) broadcasts during the night of the mishap contained no mention of the construction or modified taxi route.

A local NOTAM was appropriate but not issued.

This incident clearly demonstrates the need for strict compliance with all safety regulations. Had adequate precautions been taken by both the aircrew and airfield facilities, this mishap would not have occurred. The failure of the pilot to contact Ground Control immediately upon leaving the duty runway and the failure by airfield personnel to ensure that obstacles were properly lighted contributed to the mishap.

There is a good message for all naval aviators in the above incident. When operating at night at a strange or otherwise unusual airfield, there are perils aplenty. Temporary lighting, no lighting, etc. require the utmost caution on the part of pilots. Until you are sure there are no obstacles in the aircraft's path, taxi lights should be used. Otherwise, a mishap such as described above will be waiting for you and your aircraft — in the dark.

CDR Fred Vogt (left) and RIO LCDR Don Santapaola (right).

Attaboy. CDR Fred Vogt, the CO of VF-33, and his RIO, LCDR Don Santapaola, were returning to the INDEPENDENCE (CV 62) in their F-4J after a routine night mission. After lowering the gear at 8 miles, their "routine" flight was interrupted by three quick muffled explosions which produced a fireball emanating from the port intake. The *Phantom* began to yaw and commenced an uncommanded left roll with loss of altitude. CDR Vogt selected full afterburner on both engines, raised the flaps to one-half, retracted the gear, and countered the left yaw and roll with full right rudder and aileron. He gave his RIO a "stand by to eject." After what seemed like an eternity, he regained control of the *Phantom* at 700 feet MSL. With wings level, a slow climb was begun.

An attempt to clear a possible compressor stall was unsuccessful. With fuel flow and RPM dropping and EGT rising, the port engine was secured. The RAT was extended, and an airstart was attempted, but was unsuccessful.

Aircraft configuration included two LAU 17s, four LAU 7s, and two AIM-9Ls with a centerline tank. The centerline tank was jettisoned. An 8-mile straight-in ASR approach was commenced. A flawless night single-engine landing was made. A well-deserved Attaboy to CDR Fred Vogt and LCDR Don Santapaola for executing NATOPS procedures to perfection. ◄

Experience by proxy

My pilot was dead.
Cause: drowning.
Reason: unknown.

By LCDR Ted E. "Stump" Dewald
Phantom RIO
NAS Chase Field

AN autopsy showed no incapacitating injuries. Nonetheless, his life preserver was not inflated, his chute was still attached. He was observed in the water upon entry but never moved, apparently unconscious. In the chop and swells of the Pacific, the rescue swimmer could not save him. My fear was that I'd ejected him when he was not ready and stunned him into a deadly daze. This was proven false when the engineering investigation studying the recovered seat found he'd initiated his own ejection. What killed him?

He was a good student with only the normal growing pains coming through the RAG, but on one February night in 1978, we both took the final exam. We'd trapped aboard a pitching carrier deck when I fully expected a bolter. We'd been high when in-close, but he wisely left the power on and, thankfully, did not execute the standard student "go for it." The deck came up just as we cleared the ramp, resulting in a hard landing – but by no one's estimation hard enough to cause total failure of the centerline splice plates to which the wing spars were attached. Still, that's exactly what happened! This was borne out when an engineering investigation uncovered massive corrosion and a crack in the splice plate.

The impact was unexpected and very hard, since all of the shock was taken by the fuselage and not one foot-pound was absorbed by the landing gear. The break was immediate, and my head fell forward harder than usual. When it came up again, all I saw was flames. I knew instantly that ejection was in order. The LSO, being of quick mind, pointed that out to us in case we had doubts. Finally, I found my handle and yanked. After several eternities, I "slipped the surly bonds" of the fireball below, followed closely by my pilot.

Everything tumbled, and though completely unhurt, I could not "cage" my conscious mind. I knew there was something I had better be doing, but I felt as if I were awakening from a deep sleep and struggled to find reality. By the time I managed to wake up, I was quite amazed. I had already inflated my life preserver and was preparing to detach my parachute! **I had already done these things** – uncommanded by my conscious mind.

Regaining the "present tense," I continued with my water entry procedures, and the rest of my story reads like an excerpt from NATOPS or a rescue manual. The ejection-to-rescue time was 2 minutes, but the critical first few seconds were carried out virtually unconsciously. But again, why was my pilot dead?

I asked myself that question over and over for months as I relived the incident repeatedly. Then, as suddenly and unexpectedly as the accident itself, a theory appeared on the horizon.

The very night of my ejection, I had listened to a fellow RIO describe his own carrier accident and ejection in great detail. I remembered that, as he talked, I could picture the crash, smell the air, feel the wind, and sense some of his sensations. I was almost living it! I was gaining "experience" in this emergency situation without having to be there. Of course it was not as vivid, but it was not as hazardous either. And it

was vivid and real enough to my senses to firmly implant the event into the emotional and instinctive part of my mind. My nervous system had somehow been educated into "remembering" something I'd never experienced.

When it suddenly happened to me, just a few hours later, my conscious mind was jarred loose and became confused, unable to process the data and recall the procedure. The instinctive part of me took over while my reasoning part tried just to find "up."

At that time I had 1,100 hours, had heard about innumerable emergencies, and had known some of the participants involved. Every time I read about a friend or listened to a sea story, I was unknowingly receiving emotional preparedness training or *experience by proxy*. My pilot in that mishap had spent 2 years learning only NATOPS, raw facts, procedures, and whatever emotional training the stresses applied by the training command instructors could provide, which is considerable but not exhaustive. He had very little practical knowledge of "how he would feel in the event of . . ." He had never before ejected. I had. Only by "proxy" perhaps, but my mind was familiar with the experience, and it was programmed with a backup system.

Theory? Maybe, and I treated it that way, too. But just in case, for the next year, I related the incident to every RAG class. I saw some of their eyes widen as I spoke, and I felt it was helping. Then, less than 1 year later, I got another piece of supporting evidence – firsthand – to substantiate my theory.

As if once in a career is not enough, I suddenly found myself looking down at the cold Pacific. I was again without my trusty *Phantom*, but this time it was from 24,000 feet. This ought to be a cinch for a veteran like me, right? Not quite.

Upon ejection at negative G, the 350-knot wind blast forceably removed my helmet and oxygen mask, which were both cinched tightly for ACM. The blast, or something else,

knocked me unconscious momentarily. When the lights came on, I was again in a daze and operating at a reduced mental capacity (nothing close to the cool, collected state in which I studied the procedures for a high-altitude ejection). I noticed the ocean and realized I was quite high, but I was still concerned because I felt I was tumbling end over end. That perception, for starters, was wrong. I was merely spinning upright under my stabilizer drogue (just as stated in NATOPS). If I had remembered that, I probably would have realized the seat was working as advertised. Instead, I concluded that I did not have a parachute over me (correct) and that it must have malfunctioned (incorrect). I then pulled my D-ring, which was also wrong, since I had not released my seat pan first (NATOPS is quite clear on that). In my dazed condition, I did not know I was under a drogue, I did not know I had lost my helmet, I did not even feel the seat pan firmly attached to my rear or have a sense of being in it at all!

So I pulled the D-ring. Nothing happened. I considered the situation rather unexcitedly, I must say, but still did not realize the presence of *Martin-Baker's* finest attached to me. Though I was still muddled, that trusty H-7 ejection system knew its role precisely and performed flawlessly. I then felt a very positive jolt, and shortly thereafter, the bats left the belfry and I realized what had happened. I was in my seat all along and the H-7 was counting off the feet barometrically – from 24,000 feet, where it and I left the F-4, to 13,000 feet (± 1,500 feet) MSL. And when it got there, it deployed my chute and freed itself from me, as a good seat should.

From then on, the events closely followed the DWEST training, complete with an oscillating chute, parachute drag, partial entanglement, and helicopter pickup.

So where is any evidence of experience by proxy? Well, I'd never mentally put myself in the position of a high-altitude ejection. I'd never heard anyone describe the free fall from high altitude, so I didn't even recognize it, consciously or otherwise. My instinctive backup system was trained for pulling a D-ring but not riding a seat.

"So what? That proves nothing," you say. Maybe, but my pilot, who had never ejected, had heard a vivid description of the free fall, and he remembered. He knew he had to wait out the seat. In fact, he remembered even more! While anxiously awaiting his chute-opening, he saw mine open – well above him. He thought he then had a possible malfunction, but instead of pulling the D-ring, as I had, he remembered to beat the seat first and started with those procedures. His seat had merely been calibrated lower than mine, and his chute opened automatically before he could release himself from the seat. We had similar rescue experiences and are both around to tell the tale.

There are two points I wish to make. I think it would be well worth the effort, in terms of improving aircrew performance under stress and reducing accident and (especially) fatality rates, to devise a way to expose all aircrews to emotional preparedness training in the form of face-to-face briefings on "sea stories" by those involved. We're doing it to some extent in SERE seminars, for instance, when we actually talk to an ex-POW. I get that same feeling of being there when I hear them speak as I did when my RIO friend described his accident. Consequently, I feel I have some idea of how I will feel if that situation ever happens to me.

In TOPGUN, we were exposed to an actual MIG killer and heard him speak. That kind of *war story* training acquaints us with the stresses and sensations of combat. And the biggest single source of this type of training is in readyroom sea stories on everything from combat to emergencies to liberty! (Hey, a good naval aviator has to be emotionally prepared for everything!)

I strongly believe a more organized and complete set of briefings by good storytellers who were actually involved in an aircraft mishap would greatly improve overall fleet preparedness to handle all types of combat, emergency, and survival situations.

My second point is aimed directly at all my colleagues. If you spend your whole career thinking "It'll never happen to me," you are ignorant. (I was told once that of all aviators who spend 20 years in the Navy, 52 percent ejected at least once. That, of course, excludes those who get killed trying to finish one cruise.) You will also be unprepared and cheating yourself out of an extra chance to live if it does happen to you. In terms of combat, you are cheating your boss out of a totally professional person able to perform in all respects. Besides, if you get the bad guy the first time, or blow up the target, or find and destroy the submarine immediately, you might prolong your own life in the process.

So, seek out the guy who has "been there" and ask him what happened and what he did. Above all, have him describe *what it felt like*. If you get enthralled and feel your heart beating harder, you are getting experience that will help keep you alive and effective. That kind of experience is less painful, believe me! ◄

The correct procedures in the event of failure of the automatic seat separation and parachute deployment feature with a Martin-Baker seat are as follows: pull emergency harness release handle; physically separate yourself from the seat; then pull the parachute D-ring. (This will require a two-hand pull – left hand holding the left riser with the right hand pulling the D-ring down and across your body.)

The Safety Education and Training Department at the Naval Safety Center is compiling a videotape library of egress and survival experiences for use in the type of training LCDR Dewald proposes. – Ed.

The most unforgettable safety officer

By CDR D. M. Layton (JUN '65 *APPROACH*)
Updated by LCDR J. E. Novitzki
Aviation Safety Programs
Naval Postgraduate School

I'VE been in many squadrons and seen many safety officers, but the one I remember best is Barcus. That isn't his real name, of course. Not that he's too modest for me to mention his name; to the contrary, he'd gather up all the copies of this story for himself if his name were in it. Maybe that's what makes him so unforgettable. If there was any one characteristic that stood out about Barcus, it was his brashness. Never a hindrance, this brashness was used to great advantage in his safety program.

Now that's not really the truth, because Barcus didn't have a "program." At least it didn't appear he did. Everything just seemed to happen – and just seemed to happen for safety! I realize this probably took a lot of behind-the-scenes planning, but outwardly, there was nothing but the appearance of spontaneity.

Of course, Barcus used all the gimmicks – the copy of *APPROACH* on a string in the head, the safety posters over the drinking fountain. He even moved the photo of the *Old Man* in order to install a "Safety Board" with pockets for *MECH, DRIVER*, and other publications, such as the AF *SAFETY JOURNAL* and occasionally even the U. S. Army Aviation *FLIGHT FAX*. These were read, too. Not just as time would permit, on a rainy-day, read-and-initial basis, but on a regular basis.

Oral or written questions tossed in during the morning All Officers' Meeting could easily disclose whether or not you had been through the safety file recently. Even at those AOMs where the subject was not safety, you could count on Barcus getting in at least one word on the subject.

As I said before, the one trait you would notice first was Barcus's brashness, but the thing you'd remember longest was his thoroughness. He was successful in baiting pilots more senior in rank and more experienced in flight-hours than he by the simple method of knowing the book. I'll swear he could almost recite the NATOPS Manual – not only by what the paragraphs said, but by what they meant and by what relationship they had to other parts of the book. Even the maintenance publications fell under his perusal pattern. He didn't do this to show off – he just wanted to know the most he could about the aircraft he was flying.

It didn't take a new pilot long to realize Barcus spoke as an expert. When he asked a simple question that had a simple answer – which no one knew – there was a great scurrying around for manuals and other publications before the next day's AOM. There was never any question about giving Barcus a collateral job. He was so busy being ASO there wasn't time left for anything else.

A *gung ho* safety officer could do his job of getting aircrews to think about safety so much they'd never fly, the planes would sit on the ground, and the accident rate would go to zero. Not so with Barcus. There were no pussycats in that squadron; every man was a tiger. And Barcus was *King of the Beasts.* He could, and would, turn his plane every way but loose. He could push it, should the occasion demand, right to the edge of the envelope. Most of the time, he planned his flights so well he never had to fly *near* the edge of his aircraft's performance envelope; that's the mark of a truly great pilot. Still, he knew exactly where the envelope boundary *was.* And by exactly, I mean precisely. Not some sketchy figures based on approximate weights and rough rules of thumb. He didn't trust his memory for this either. Preflight computations, inflight determinations and, above all, checklists were part of his flight equipment, the same as his flight suit and helmet.

Barcus had his desk in Operations, but this was just a place to hang his hat. His beat included Operations, Maintenance, the hangar, the flight line, and even the supply office. If he saw an unsafe practice, it was resolved on the spot, and not by a memo to the XO or skipper. A check crew on a workstand without guardrails was instructed to stop work and install the rails; then the maintenance officer was informed of the problem and of the action taken.

What made Barcus such a good ASO? It really wasn't his brashness or his knowledge. It was his teaching by example and his development of self-motivation in others. He demonstrated to all hands that you could fly the aircraft and complete the mission in a safe manner better than you could in a half-safe way. Soon, we were trying to out-do and outthink him, and before we realized what we were doing, we thoroughly learned our machine and our techniques.

Yes, I recall a lot of safety officers, but as they used to say on an old TV show – most of all, I remember Barcus.

A nose for trouble

By LCDR Bob Francis
VP-0919

Skid marks show aircraft's swerve to the right and position of the P-3 after the pilots were able to bring the aircraft to a stop.

THEY *thought* they were beginning a long-range P-3 overwater flight from Barbers Point to NAS Whidbey Island. The preflight and briefings were routine. During the long taxi to the duty runway, the flight engineer reported some problems with the *Orion's* air conditioning and pressurization. This necessitated a return to the line area, where the problem was quickly remedied. Soon, the aircraft departed for NAS Whidbey.

The en route and approach segments of the flight were conducted successfully. On touchdown, however, a shudder was detected as the aircraft began to decelerate. This was followed by a tendency for the aircraft to swerve to the right. The PPC was able to stop the swerve using rudder and aileron, and the aircraft was stopped uneventfully.

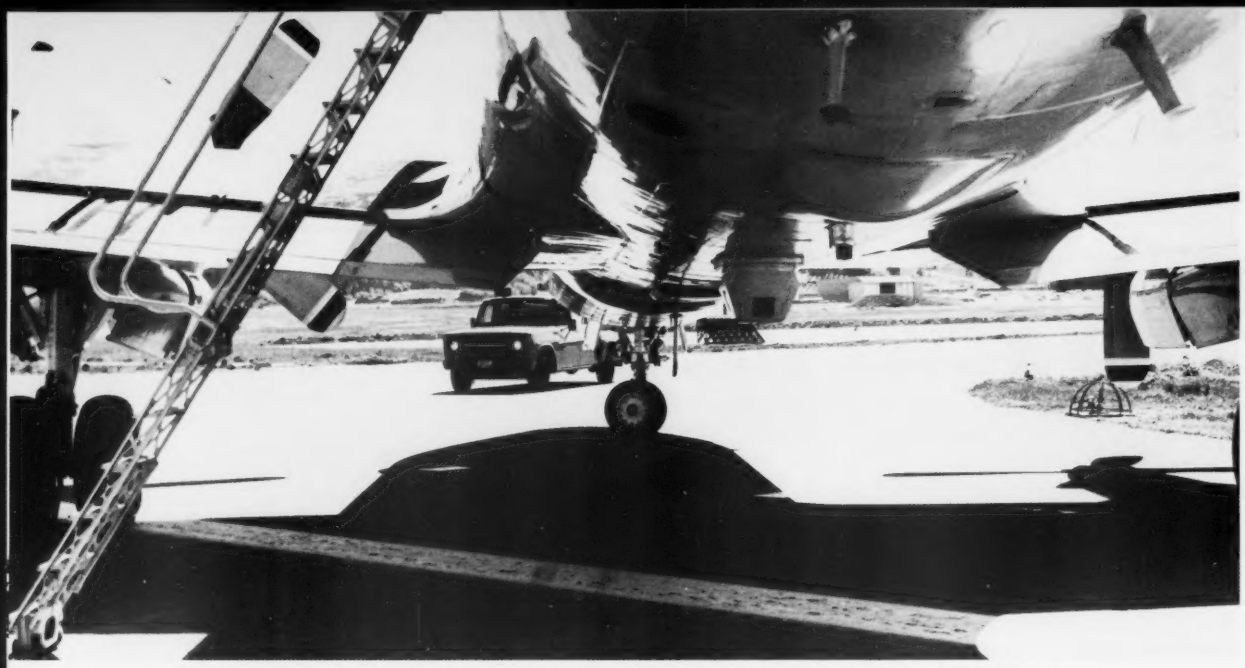
Investigation revealed a blown starboard outboard tire. There was speculation that the long, hot, taxi evolutions at Barbers Point might have contributed to the deflated tire.

That evening, the tire was changed and the aircraft readied for the next leg of their journey – a passenger dropoff at a civilian field. The pilots arrived at the aircraft, inspected the changed tire and landing gear, and discussed the maintenance performed with the local maintenance control personnel. The pilots were particularly interested in determining if a landing gear "drop check" was required or advised. Assured this was not required, the PPC replied that he would take a minimum crew and go around the pattern once to functionally check the landing gear before loading passengers and departing for the much smaller civilian field.

Takeoff and climb to the Delta pattern occurred uneventfully. The gear were lowered and raised several times. On each occasion, everything operated normally. The aircraft descended back into the pattern and set up for a full stop landing.

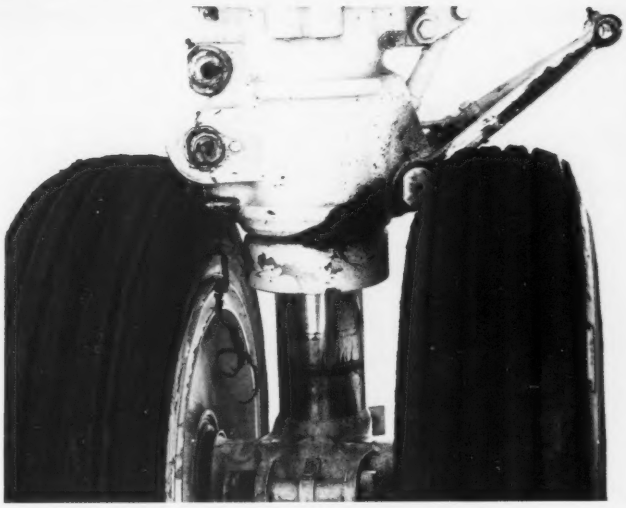
The aircraft touched down normally and on centerline. When the nosewheel was lowered, however, a noticeable shudder began vibrating the airframe. The aircraft began a swerve to the right. Rudder and aileron had little effect as the aircraft continued shuddering and "wandering" to the right. Differential power helped somewhat, but as the aircraft slowed, the shuddering and swerve intensified. Finally, with both pilots on the controls and the PPC applying full rudder, aileron, differential power, and differential braking, the aircraft was brought to a stop some 70 degrees off runway heading, with the nose on the edge of the pavement.

The aircraft was evacuated and secured. Expecting to see another "blown" tire as before, the pilots were astounded to see the aircraft nosewheel jammed nearly 80 degrees to their direction of travel. A crash crewman who observed the landing through binoculars stated he saw the nosewheel



Nosewheel finally jammed nearly 80 degrees to direction of aircraft travel as aircraft was brought to a stop.

Rotational skid and skip marks from aircraft nosewheel show swerving tendency after touchdown.



The upper nosewheel scissors is shown jammed against one nosewheel tire.

begin making rapid and violent 360-degree revolutions after it was lowered.

A sweep of the runway produced a sheared nosewheel torque arm center pin/bolt that had failed and allowed the nosewheel to spin in circles. Inspection of the nosewheel showed an apparent failure of the pin holding the upper and lower nose gear scissors braces together. The upper scissors drag brace had actually jammed up against one of the nose tires as the aircraft slowed, thus aggravating the pilot's control problems.

One cannot help but speculate at the outcome of this incident had the pilots not decided to doublecheck the gear and pressed on with passengers and a heavy fuel load for the shorter, narrower civilian runway. In this case, the pilots' professional and conscientious approach worked very successfully.

By controlling and managing all the variables they could influence, these two pilots increased the odds in their favor when the unexpected occurred. Such a talent is an asset in aviation and often separates the "old" from the "bold." Indeed, in more than one sense, these gentlemen had a "nose for trouble." ◄

What meets the eye...

reality or illusion?

Visual illusions are potentially common in flying and result from the incorrect interpretation of what you see. This may be due to there being too few visual cues, so that you have to fill in the rest of the picture by drawing on your preconception of the situation, by "seeing" what you think you "ought" to see, or simply by guessing. It may also occur when cues presented to what is normally the master sense, vision, are weak and in conflict with relatively strong responses by other senses, particularly those of balance and orientation, which have sensors in the inner ears.

The purpose of this article is to draw your attention to some of the circumstances in which visual illusions may be experienced and to the hazards which the illusions may introduce during final approach. Increased awareness of these factors will enable you to recognize and compensate for most visual illusions and so reduce the risk of an accident.

Visual illusions during the landing approach may be caused by one or any combination of the following features:

- Sloping approach terrain
- Sloping runways
- Runway width
- Rain on the windscreen
- Featureless approach terrain
- Runway lighting intensity
- Shallow fog
- Rain showers
- Darkness
- Black hole effect

Sloping Approach Terrain

Normally, when a pilot makes a visual approach, he subconsciously judges the approach path from a combination of the apparent distance of the aircraft from the runway and the aircraft's apparent height above the approach terrain. If the ground under the aircraft slopes upwards towards the threshold, an illusion may be created,

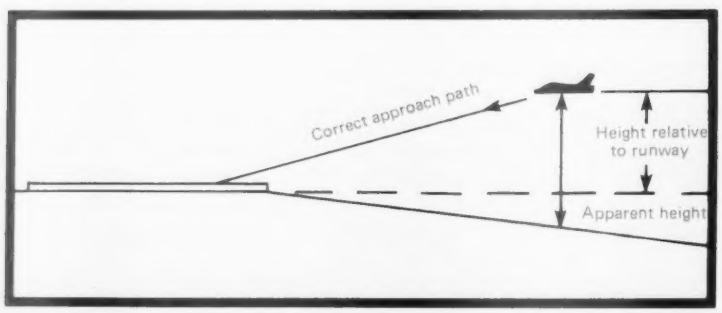


Fig. 1

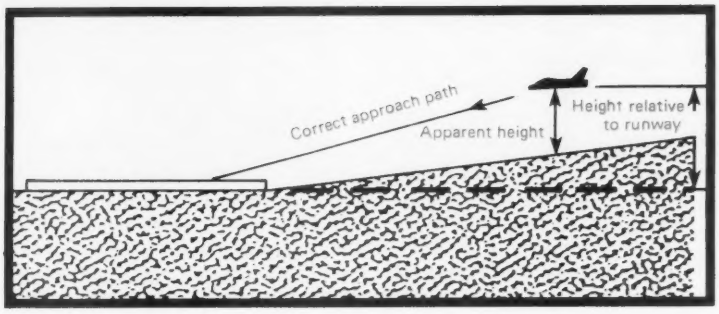


Fig. 2

particularly during the early stages of the approach, that the aircraft is too high (see Fig. 1). Conversely, ground which slopes downwards towards the threshold gives the impression that the approach path is too flat (see Fig. 2).

Sloping Runways

Through the regular use of ILS glide-paths and VASIs, with 3-degree glide slopes, pilots become accustomed to the complementary angle of 177 degrees between the runway and the approach path (see Fig. 3). Additionally, from experience, pilots come to know with considerable accuracy the amount of power required to maintain the correct approach path to the point of touch-down. If, however, the runway slopes upward from the landing threshold, and the 177-degree relative angle is maintained, a visual approach will be lower than it should be, by about the same amount as the runway upslope, and the "usual" power setting will be inadequate to meet the requirements of the flatter approach. If the runway has a downslope, the converse applies, so that by maintaining the 177-degree angle relative to the downsloping runway, the approach to the touchdown point will be steeper and the "usual" power setting in excess of that required.

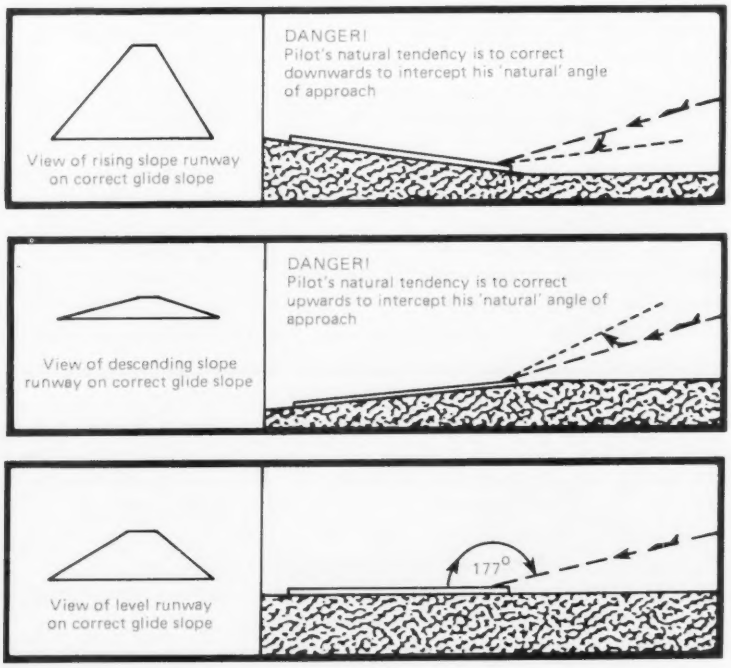

DANGER!
Pilot's natural tendency is to correct downwards to intercept his 'natural' angle of approach
View of rising slope runway on correct glide slope
DANGER!
Pilot's natural tendency is to correct upwards to intercept his 'natural' angle of approach
View of descending slope runway on correct glide slope
177°
View of level runway on correct glide slope

Fig. 3

Runway Width

The ability to use the apparent convergence – due to perspective – of two parallel lines to estimate their length is well known. Increasing or decreasing the distance between the lines, however, can create the illusion of shortening or lengthening them. On the approach, a pilot bases part of his judgment on a mental comparison of the runway before him with the "normal" view of the runway to which he is accustomed. Variations in the runway width, therefore, can be misleading. For example, the wider the runway, the shorter it appears; moreover, the width can also have an effect upon the apparent height of the aircraft in relation to the runway, a wider runway making an aircraft appear lower than it is.

Rain

Heavy rain can affect the pilot's perception of distance from the approach or runway lights by diffusing the glow of the lights and causing them to appear less intense. This may lead him to suppose the lights are farther away than they really are. On the other hand, only a little scattering due to water on the windscreen can cause runway lights to bloom and double their apparent size, resulting in the pilot believing he is closer to the runway than he actually is, leading possibly to a premature descent. Similarly, rain on the windscreen can cause illusions as a result of light ray refraction. For instance, even though an aircraft is correctly aligned on the approach path, it can appear to the pilot to be above or below the correct glide slope or left or right of the runway centerline, depending upon the slope of the windscreen and other circumstances. The apparent error might be as much as 200 feet at a distance of 1 mile from the runway threshold.

Featureless Terrain

Even in good visibility, visual descents over calm seas, deserts, snow or unlit

terrain at night can be hazardous. The absence of external, vertical references makes judgment of height difficult, and the pilot may have the illusion of being at a greater height than is actually the case, leading to a premature or overly rapid descent. Height above the runway is also made more difficult to judge if, because of snow, for example, there is no contrast between the runway surface and surrounding terrain. The problem is compounded if the descent is made into the sun or in any conditions which reduce forward visibility.

Runway Lighting Intensity

Because bright lights appear closer to the observer and dimmer lights farther away, the intensity of approach and runway lighting can create illusions. Thus, on a clear night, runway lights may appear closer than they actually are, particularly when there are no lights in the surrounding area.

Shallow Fog or Haze

In shallow fog or hazy conditions, especially at night, entire approach and/or runway lighting systems may be visible from a considerable distance during approach, even though Runway Visual Range or meteorological reports indicate the presence of fog. On descent into such a fog or haze layer, the visual reference available is likely to diminish rapidly. In extreme cases, it will reduce the full length of the approach lights to a very small segment. This is likely to cause an illusion that the aircraft has pitched nose up, which may induce a pilot to make a corrective movement in the opposite direction. The risk of striking the ground with a high rate of descent as a result of this erroneous correction is very real.

Rain Showers

An isolated rain shower may reinforce a pilot's visual indications that he need not apply power to reach the runway or to arrest a high rate of descent. A heavy rainstorm moving toward an aircraft can cause a shortening of the pilot's visual segment – that distance along the surface visible to the pilot over the nose of the aircraft. This can produce the illusion that the horizon is moving lower and, as a result, is often misinterpreted as an aircraft pitch change nose up. A natural response by a pilot would be to lower the nose or to decrease power.

Darkness

The greatest confusion potential exists at night. Darkness provides excellent camouflage, and the eye loses much of its efficiency. Normally used cues such as shadows, color, and detail are not available. Lights must compensate for this loss, but lights usually lack sufficient definition to provide more than an outline, an incomplete stimulus to which the pilot may or may not react correctly. At the other end of the scale, we have a profusion of lights. Large airfield complexes have so many lights that frequently there is considerable difficulty experienced in just finding the runway.

Black Hole Effect

This illusion can occur on a clear night with no visible horizon. The aircraft approaches the runway over the sea or other featureless, unlighted terrain toward an aerodrome with bright city lights behind it. Visibility is so good that there is little need to rely on the instruments, except to check the airspeed. The straight-in approach is totally uneventful until the aircraft lands short of the runway, possibly by several miles. What could have gone wrong?

Under these circumstances, a pilot relying on a visual approach will tend to fly along the arc of a circle centered above the pattern of city lights, with the arc's circumference contacting the terrain. Such a path results from maintaining a constant, visual angle subtended at the eye by the nearest and farthest city lights. When deceptive conditions are present, this kind of approach path can go to critically low altitudes. The lack of foreground lighting results in the pilot being denied important closure information without his awareness and, consequently, the aircraft lands short (see Fig. 4).

Avoiding the Problem

Be aware of the circumstances in which visual illusions may occur, and be prepared to take corrective or alternative action. Learn to recognize impending situations which may place the safety of the aircraft in jeopardy.

Study aerodrome charts, maps, and other applicable reference material to determine runway slope, the slope of terrain around the aerodrome, the relative position of the aerodrome, surrounding features, and the aerodrome approach and runway lighting in use.

Anticipate the need for rain repellant on the windscreen, and use it as necessary before departure.

Wherever available, use ILS or VASI to monitor the glide slope. If a DME is located at the aerodrome, use the "rule of thumb" (300 feet per nautical mile for your descent profile), but remember to take into account the relationship of the DME beacon to the threshold of the runway in use.

If the duty runway has no precision approach aids, consider the need to request an alternative runway with precision aids. When no precision aids are available, fly a full circuit, never a straight-in approach. The aircraft can be more accurately positioned at 600 feet on a 2-mile final having flown a full circuit than on a straight-in approach without aids. It may also be possible to position the aircraft at

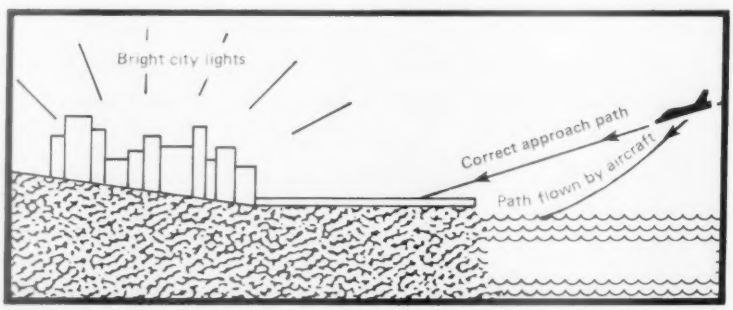
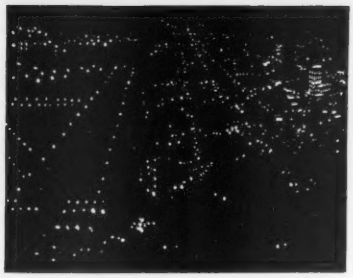
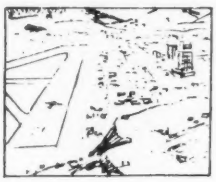


Fig. 4



NIGHT REFERENCES
Is this a 10,000-foot runway seen from 1,000 feet AGL at 3 miles or an 8,000-foot runway from 700 feet AGL at 2½ miles? Is the dark area at the lower right a sparsely populated section or an unlighted obstacle such as a hill?



a known point, such as over a locator, at the correct altitude and approach configuration. The pilot should then obtain a visual image of the runway and maintain this image throughout the approach. If none of the foregoing procedures are possible, consideration should be given to diverting to a more suitable aerodrome.

During two-pilot operations, use the monitored approach technique. One pilot flies the instrument approach, while the pilot who is to land the aircraft monitors the approach and gains "experience" of the ambient conditions before taking control.

During single-pilot, IFR operations, the pilot should use the autopilot as the "pilot" flying the approach. While flying a coupled approach, the real pilot should try to gain experience of the conditions. The autopilot should remain engaged as long as possible, until the pilot has obtained a good visual picture and a safe landing is assured.

On all operations, avoid landing expectancy; be prepared to go around or carry out a missed approach if there is any doubt about the safety of the landing.

Wherever possible, pilots should receive training flights to aerodromes where it is known that conditions can be conducive to visual illusions.

In conclusion, remember that illusions must be expected in flying. It is human nature to want to believe our own senses rather than instrument indications. Knowledge of illusory sensations will help, because our responses are determined more by the meaning we attach to stimuli than by the stimuli themselves. It is ultimately on the basis of knowledge and self-discipline that we make decisions and select our responses.

– Adapted from Department of Transport, Australia, *Aviation Safety Digest* 111/1980

To trap an endangered species

By LCDR J. J. Guardiano

IT was just another flight from NAF Beach to USS FLATTOP. The COD was delivering mail, and it was a perfect, clear day, a day anyone would "order up" to bag a trap. The C-1A was directed to spend part of the morning on USS FLATTOP, and everything couldn't have gone better . . .

There was to be a normal Case I recovery, until . . .

The C-1A called the ball and went high. Power was reduced to intercept the glide slope. The controlling LSO (in training) responded with, "Little power, catch it in the middle." Approaching the in-close position, the C-1A went through the glide slope. The LSO called for power, at the same time *actuating the cut lights* to emphasize his power calls. The C-1A chopped power to make a normal cut landing – *Result?* TAXI, TAXI ONE WIRE!

It is extremely fortunate that an accident was averted, by the grace of . . .

With diminishing numbers of C-1A aircraft (and what could have been one less this day!), it is mandatory that, in preparation for a COD landing, CAG LSO team leaders review procedures which stress the sole use of *verbal power calls* for the C-1A.

The C-1A is an endangered species becoming an extinct animal. A dying breed needs protection!

Actually, it works

A personal survival equipment critique involving the newly

"I am well familiar with survival equipment onboard our planes," says Andy Aircrew of VP West Coast. "Besides, I had DWEST just 2 years ago."

Unfortunately, Andy didn't know he was to be involved in a simulated ditching using actual survival gear. Part of that gear is the new *Imperial* antiexposure suit.

The simulated ditching was all part of a recent emergency exercise held by VP-40. The exercise was used to demonstrate what precautions should be taken in the event of an actual ditching. This report on the survival equipment is from one "survivor's" point of view.

We, the "survivors" (five to be exact), were chosen by lot from a flight schedule event and were taken by van to Monterey Bay. The ride ended around 0730, and there were indications of a fine day on the rise. The simulated ditching would take place 3 miles off the coast. Monterey Bay is an ideal place to ditch if one is that lucky; however, reality probably isn't so kind.

We all donned *Imperial* antiexposure suits with LPA-2s added. Afterwards, the "survivors" were driven out to sea by the 129th Aerospace Rescue and Recovery Squadron (ARRS) of the California Air National Guard. Along with our personal survival gear, we were given a fully equipped MK-7 liferaft and placed in the water on our own.

Upon water entry, I was amazed how well the *Imperial* suit maintained buoyancy. I was the only person to inflate my flotation device once in the water and the first to find out the LPA flotation device is not needed for a conscious person, and I repeat, not needed for a **conscious** person. The *Imperial* will not keep an unconscious person's head out of water.

Our MK-7 worked as advertised, and I soon learned the proper way to board a raft. It was much more work than I imagined! I honestly didn't know about the handholds for the entry ladder. There is a sequence of handholds below waterline, on top of the bladder lobe, and in the middle of the raft. Boarding the raft is less complicated and not as strenuous when you're familiar with the equipment characteristics!

After a short time in the raft, some of the crewmen experienced slight seasickness due to rolling waves and excess body heat generated by the *Imperial*. (This case involved a nice warm day and 59°F water.)

Our initial concern was with opening up the survival packets and experimenting with the contents. First, we learned that dye markers are dependable and extremely useful for visual identification. Speaking of vision, especially in the dark, the kit contains a hand-generated flashlight that works well. We also conducted an experiment with the signal mirror,

By AW2 J. C. Eisenzimmer
VP-40

like this!

acquired Imperial antiexposure suit.

though it was somewhat useless on the overcast day. The most popular items available were the pencil flare with cartridge and the day/night signal flares.

The day/night signal flare demonstration started with an agonizing struggle to remove the plastic guard cap from the end. It is difficult enough to pry off with bare hands, let alone the thick mittens of the *Imperial* suit. The caps were finally jarred off using the hard corner of another metal container.

As one can detect, *Imperial* mittens were not held in favor during this exercise. While the next demonstrator fumbled with his pencil flare gun, we noticed the oversized mittens were hampering the trigger release because, with a mitten overlapping the release groove, the firing pin moved too slowly to discharge the cartridge. We soon concluded that all it takes is a little patience. Later, I found success using a two-handed method.

Shooting flares was fun, but thirst soon drove us to scramble for the desalter kit. I for one was pessimistic about a miracle desalter kit that allows you to drink the ocean's water. After a small sample, my confidence was increased, and I now consider the desalter kit a priceless article in the survival kit. Though I know a few *Perrier* fans that may choke and complain about taste, I still give the kit a "thumbs up."

For those crewmen who have a sweet tooth, the survival kit contains a pack of *Charms* candy. If you are out on a warm day, be careful when unwrapping the candy. You may end up with a taste of cellophane due to the extra sticky candy.

The remainder of the afternoon went very smoothly, and the only problem encountered came during the helo hoist. I experienced difficulty breathing with the *Imperial's* face flap in place, so I quickly removed it.

I also learned a lesson about being the first crewman on the hoist cable. It seems the cable has a tendency to get twisted up, and it just so happens that you are the weight needed to spin out that twist. I haven't felt that dizzy since my first night in the Philippines.

After fishing out the rest of the crewmen, the 129th ARRS HH-3 took us on a nice helicopter ride back to our home port. It turned out our day was a truly priceless experience, and I'm glad I could share it with my fellow aircrewmen.

Below is a summary of points that may be valuable to remember:

- Keep in mind that the *Imperial* is a great antiexposure suit and maintains good buoyancy, **but it will not keep an unconscious person's head above water.** Mind those clumsy mittens, and be prepared to pull an arm out for handling those difficult items.
- Remember, the MK-7 liferaft is equipped with a boarding ladder which makes boarding fast and simple.
- Be prepared to find some type of tool to remove the plastic cap from the day/night flares. It can really be frustrating when you have the temporary dexterity of a penguin!
- When using the pencil flare, ensure the trigger release groove is free from excess *Imperial* mitten material. Try two-hand triggering.
- The desalter kit is priceless – don't be afraid to use it!
- Finally, face material on the *Imperial* should be removed before helo hoist due to impaired breathing caused by rotor wash. ◄

YOU CAN'T BEAT THE WEATHER

By Russ Forbush
APPROACH Writer

IN earlier years, weather forecasting was a fairly primitive art, and pilots relied mainly on their instincts to determine whether or not they would take to the air. Today, however, weather forecasting is a sophisticated science. Pilots should believe the weatherman when he says adverse weather conditions will be in their flightpath. The following narrative is a classic example of what can happen when pilots fail to heed forecast or actual weather.

A couple of T-34 pilots departed NAS Southeast on an approved cross-country flight to MCAS Pacific, with an intermediate RON en route. Following the overnight stop, the pilot in command filed to a southwestern MCAS to fuel. Upon arrival, the aircraft was fueled, and the pilot filed for MCAS Pacific. The pilots received a weather briefing that indicated significant forecast weather en route and at the destination. This included a SIGMET for moderate and severe clear air turbulence, moderate and severe icing, possible heavy rain, an 8,000-foot freezing level and, at the destination, surface winds from 150 degrees at 15-17 knots, visibility of 7 miles, and a 2,500-foot broken cloud layer. At times, the destination winds would be at 20 knots gusting to 35 knots, visibility 5 miles in light rainshowers, and clouds scattered at 500 feet, broken at 1,000 feet, and overcast at 2,000 feet.

Based on the above weather forecast, the pilots should have stayed on the ground until conditions improved, but they were anxious to get to their final destination, **threw caution to the wind**, windshields to the ice, and filed for MCAS Pacific. As fate would have it, another T-34C arrived at the southwestern MCAS, and the pilots decided to join their buddies in the

flight to MCAS Pacific. After a joint briefing and discussion, both aircraft launched and commenced the mission at a filed altitude of 8,000 feet – despite forecast turbulence, icing, and rain at that level. They intentionally violated the T-34C NATOPS Flight Manual by flying into forecast icing conditions.

Fortunately, the severe weather had dissipated along the route, and the two T-34s arrived overhead MCAS Pacific without incident. Approach Control procedures were normal, and T-34 No. 1 was informed by Pacific GCA that they had him on a heading of 310, at 3,000 feet MSL, 17 miles from the air station. He was told by GCA, "Landing check your discretion; stand by for final controller; maintain 3,000 feet." This was rogered by T-34 No. 1. Gale warnings were in effect, and Thunderstorm Condition II was set at MCAS Pacific. The GCA final controller reported wind from 120 degrees at 15 knots. The T-34 had originally been advised to set up for a TACAN approach to Runway 34R, but this was changed to a PAR approach to the same runway.

The wind conditions reported above are 140 degrees off the heading to Runway 34R and completely off the takeoff/landing crosswind chart shown in the T-34C NATOPS Flight Manual. This wind angle provides for a 12-knot tailwind component and a 10-knot crosswind component on Runway 34R. **In spite of the unacceptable wind conditions**, the pilot elected to continue to a landing on Runway 34R.

The T-34C approached the airport, and at 7.8 miles, the landing gear were lowered following a Pacific GCA "Wheels should be down" check. Visibility was reported as 4 miles, and braking action on the runway was reported poor by another aircraft which had recently used the facility. When the T-34C arrived at decision height, the pilot reported the runway in sight and was advised to "report on deck" by GCA. The approach was being flown in the no-flap configuration, to a wet runway, with the wind blowing from behind the right wing of the aircraft. The pilot in control was the copilot.

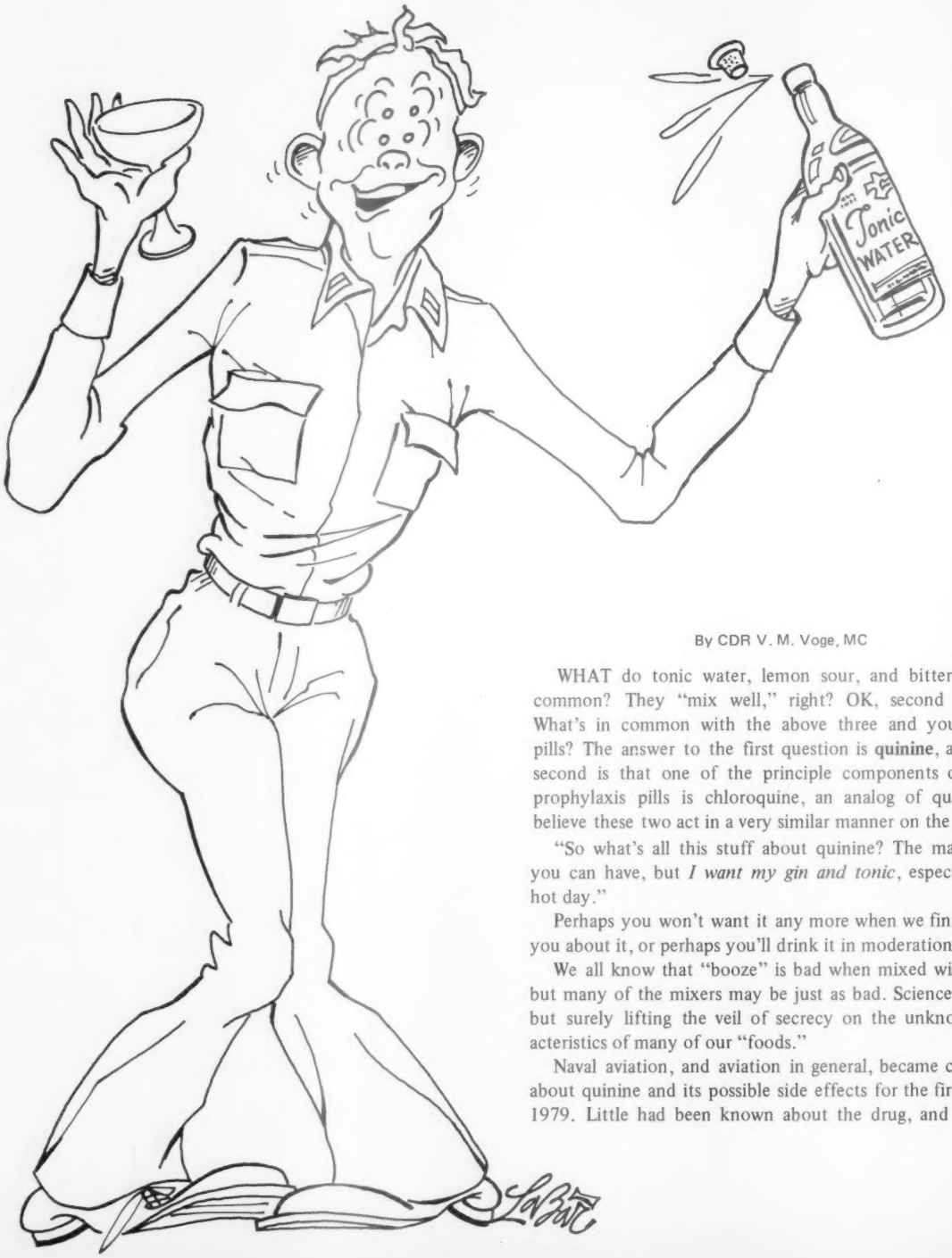
The T-34 touched down past the approach end (34R) arresting gear and entered a left drift, which was not controlled by the copilot. He attempted to regain directional control with full right rudder, then rotated for takeoff, adding full power. Both pilots attempted the waveoff and retraction of the landing gear – to no avail. The *Mentor* initially impacted the 5,000 feet remaining sign on the left side of the runway. This deflected the aircraft downward as the landing gear was retracting. The *Mentor* then slid across the grass between 34R and 34L, impacted the E-28B arresting gear engine housing on the right side of 34L, and came to rest. The aircraft sustained major damage, but neither pilot was injured. The crew of the second T-34 was able to profit from the errors made by No. 1 and landed safely on an alternate runway with more favorable winds.

There were several errors involved, and they are discussed below:

- The pilots violated the T-34C NATOPS Flight Manual by filing and flying into forecast severe turbulence and icing conditions, both of which are specifically prohibited by NATOPS. The fact that these conditions diminished as the flight progressed was only a matter of luck.
- The pilots failed to properly interpret the seriousness of the crosswind problem at MCAS Pacific. A prudent naval aviator would have requested a circling approach to a runway with more favorable wind conditions. A pilot is not bound to land on a runway designated by Approach Control. The Airman's Information Manual states, "It is not necessary for a controller to specifically inquire if the pilot will use a specific runway. If a pilot prefers to use a different runway than that specified or one more nearly aligned with the wind, he is expected to notify ATC accordingly."
- The pilot at the controls used improper recovery procedures after entering a left drift upon touchdown. He attempted to regain directional control using full right rudder. He then rotated for takeoff and added full power. The T-34C NATOPS Manual states, "The crosswind correction should be maintained during the initial part of the rollout (aileron into the wind to hold the wing down)." The primary T-34C familiarization and basic instruments instruction states, "The three control measures regulated from the cockpit which can be used to control the aircraft on the ground are the rudder, brakes, and ailerons. The power control lever (PCL) is not used to aid the pilot in directional control." Additionally, the aircraft was well into a hydroplaning regime, therefore, rotation and the addition of power aggravated the situation and contributed to the controllability problems.
- None of the four naval aviators piloting the two T-34Cs pulled the plug on the departure from the southwestern MCAS for MCAS Pacific, despite the forecast weather en route and at destination. The weather was discussed among them, and they were willing to chance the flight even though they were in violation of NATOPS.

The fact that no one was killed or injured in this mishap is most fortunate. Blunder after blunder was the rule of the day. Once again, flight crews attempted to beat the weather and, as so often happens, one of them failed to make it. ◄

"Aha! It's the



By CDR V. M. Voge, MC

WHAT do tonic water, lemon sour, and bitters have in common? They "mix well," right? OK, second question: What's in common with the above three and your malaria pills? The answer to the first question is **quinine**, and to the second is that one of the principle components of malaria prophylaxis pills is chloroquine, an analog of quinine. We believe these two act in a very similar manner on the inner ear.

"So what's all this stuff about quinine? The malaria pills you can have, but *I want my gin and tonic*, especially on a hot day."

Perhaps you won't want it any more when we finish telling you about it, or perhaps you'll drink it in moderation.

We all know that "booze" is bad when mixed with flying, but many of the mixers may be just as bad. Science is slowly but surely lifting the veil of secrecy on the unknown characteristics of many of our "foods."

Naval aviation, and aviation in general, became concerned about quinine and its possible side effects for the first time in 1979. Little had been known about the drug, and certainly

tonic water, after all!''

none of that knowledge had been directed toward the aviation environment. Quinine had been found occasionally in autopsy specimens, and the only comment was that the aviator had probably had a gin and tonic the night before. In 1979, by a quirk of fate, three fatal aircraft mishap parameters were associated: high-speed maneuvers, loss of flight control, and low levels of quinine found in the body tissues at autopsy. Quincy himself couldn't have done better private-eye work! The Armed Forces Institute of Pathology reasoned that quinine, such as that found in tonic water, may be a contributory factor in the cause of military aircraft mishaps. A full-fledged study to prove or disprove this hypothesis was begun.

It is interesting to look back to see what quinine is and how it became important. Quinine comes from the bark of the cinchona tree (named for the countess of Chinchon, in 1638, by the Danish botanist Linnaeus). In its pure form, it is a white, crystalline powder with a bitter taste. It is used in bitters, tonics, and "cold" preparations. It is a general protoplasmic poison to *all living cells*. It effectively reduces fever, primarily by increasing perspiration. It is a mild pain medication (analgesic). In high doses, it depresses the heart muscle. It causes the uterus to contract in full term pregnancies, although its use to induce abortions is unreliable. It can also cause hypersensitivity, allergic and idiosyncratic reactions.

Not much is known about quinine, in spite of its long

Not much is known about quinine, in spite of its long

clinical history. Most studies on quinine were completed more than 40 years ago. What little is known follows: it can cause spontaneous nystagmus (involuntary rapid movements of the eyes from side to side); it has a direct, toxic effect on the cells of the cochlea and vestibular apparatus (balance and orientation organs of the inner ear) and the retina; it constricts blood vessels; it may, with normal doses, cause deafness and blindness to babies while in the mother's womb; it causes disorientation and vertigo in laboratory animals; it accumulates in the endolymph of the inner ear (organs of balance and orientation); only 10 to 18 percent of ingested quinine is excreted from the body in the first 24 hours, and it may take up to 2 weeks to rid the body of all quinine after a period of daily ingestion.

How much quinine is in that tonic water that tastes so good with your gin? Commercially available tonic water contains about 5.5 to 6.8 mgm/100cc of tonic water. (According to the FDA, tonic water may not contain more than 8.3 mgm/100cc of quinine.) That's about 13.2 to 16.3 mgm/cup (8-ounce glass). Not much, right? And certainly far below the level found in malaria prophylaxis pills. So what's the sweat?

Quinine is a recognized drug. It's used in tonic water, bitters, etc. because of the distinctly bitter taste some of us enjoy so much. We consider it very "thirst quenching."

What the Armed Forces Institute of Pathology has found in some preliminary studies is that quinine, in the form of tonic water, can cause involuntary nystagmus in individuals drinking the equivalent of 3 to 4 glasses of tonic water daily. It routinely caused such symptoms as lethargy, transient loss of visual accommodation, loose bowel movements, headaches, and slowed thought processes in all groups of subjects studied.

With this information in hand, the Armed Forces Institute of Pathology recommended that "the Surgeon Generals of the Armed Forces recommend that military aviators be *prohibited* from ingesting tonic water with quinine while on flying duty with the Armed Forces." The question concerning malaria prophylaxis was put forth, since chloroquine is believed to act in the same manner as quinine. BUMED issued its guidance on prescribed malaria prophylaxis for deployed aircrew personnel as follows:

"Recent AFIP studies have shown minor changes in vestibular functions on chronic, moderate dosage quinine ingestion. Such changes appear to be dose related, with wide variations in individual tolerance. Studies using dosage similar to that for prophylaxis, recommended in BUMEDINST 6230.11G, are not completed.

"Balancing the potential threat of altered vestibular function against the very real threat of malaria, it seems prudent to continue malaria prophylaxis as recommended in the aforementioned instruction.

"All SMOs, flight surgeons, and aviation commanders must be alert to the possibility of decreased flying performance in aircrews on malaria prophylaxis. Aircrews should be closely monitored, and any possible adverse reactions or performance decrements thoroughly investigated, documented, and reported to BUMED for epidemiologic analysis. Flight surgeons and aerospace physiologists should reemphasize vestibular physiology in squadron training. Exposure to malaria-endemic areas should be minimized, consistent with operational necessity. Schedules for prophylactic drug administration should be tailored to minimize the time during which an individual aircrewman is at risk due to drug ingestion."

The guidance is clear. The danger is clear. Tonic water may be hazardous to your health. This is especially true in low-level, high-speed flight with rapidly changing attitudes. It can, however, affect all communities. *A word to the wise . . .*

LT Berg (left); LT Stichter (right)

LT Blake Stichter
LT Chris Berg
VF-24

ON the morning of 11 September 1980, LT Blake Stichter and his RIO, LT Chris Berg, launched in their F-14 off USS CONSTELLATION, in the East China Sea, on what was scheduled to be a routine air intercept mission. Forty-five minutes into the flight, while performing the second "max conserve" intercept, LT Stichter rolled the F-14 inverted to maintain sight of his wingman, who'd flown 2,000 feet below.

Shortly after bunting the nose to maintain altitude, the aircraft transitioned from .5 negative G to approximately 2 negative G with the stick programming forward on its own. The left wing rolled up to 30-45 degrees angle of bank, and the F-14 began a steady-state, port turn while still inverted. The aircraft arced through 90 degrees of turn, at 250-300 KIAS, 19,000 feet MSL, with the crew slightly incapacitated from being up against the canopy. To counter increasing negative G, LT Stichter continuously attempted to pull the stick aft but received no aircraft pitch response. Apparently, the hydraulic assist to the flight controls was not functioning. Still, the controls were not binding at all. All cockpit hydraulic pressure indications were normal. After 90 degrees of turn, the nose finally fell through to 90 degrees nose down, and airspeed increased to 350 knots.

From 19,000 to 12,000 feet, LT Stichter continued to apply aft stick but was unsuccessful in regaining pitch response. At 12,000 feet, 400 KIAS, with a nosedown attitude of 110 degrees and negative G steadily increasing, LT Stichter recognized his *extremis* situation and made a last-ditch effort to regain positive G on the aircraft. While pulling with a strength only men in a life and death situation can attain, LT Stichter **broke the stick grip** cleanly from its mount, leaving only a stub and a wire bundle. Realizing any further attempt to recover was hopeless, he reached for the face curtain handle. Passing 10,000 feet, at 450 KIAS, he attempted to eject but was unsuccessful because the handle was pinned against the canopy by his helmet. He ruled out using the alternate ejection handle after realizing the aircraft was now above 500 KIAS, he himself was 2-3 inches off the seat, and his back and neck position was such that death would have been almost certain.

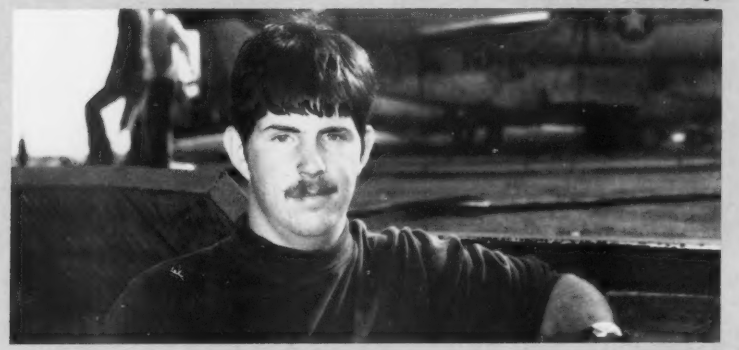
After ruling out ejection, LT Stichter looked back at the stick stub and noted it had begun programming forward on its own. He grabbed the stick stub and continued pushing forward, realizing he had only a minimum amount

of altitude left. As they approached the bottom of an outside loop, LT Stichter and LT Berg experienced about 7-8 negative G. As the nose of the F-14 approached the horizon, LT Stichter continued to "push" the aircraft out of the dive and allowed it to gain altitude and lose airspeed while still inverted. The aircraft had bottomed out at about 4,000 feet and was climbing through 5,000 feet when the altimeter was next checked. Lateral stick was then applied, and the aircraft rolled upright. Complete control of the *Tomcat* was regained.

Now faced with making a CV landing with a stub control stick, the aircrew climbed to 16,000 feet and performed a controllability check. LT Stichter noted that, with flaps down, the stick position was too far aft to make a comfortable carrier landing. Therefore, he elected to make a flaps-up approach, which afforded a more forward stick position. An uneventful, straight-in approach was made to an OK 3 wire on a deck pitching 10 to 15 feet.

This emergency was truly unique. The aircraft and their lives were saved only by instant assessments and actions. For their extraordinary feat, the crew was awarded additional accolades – an Air Medal and Pro of the Week award from their wing commander and Commander, Naval Air Force, Pacific Fleet.

PH3 Karl E. Scarborough



PRAN David G. Johnson
VA-35

ON the night of 2 March 1981, onboard USS NIMITZ (CVN 68), PRAN David G. Johnson was working in the VA-35 aviators' equipment room, located aft on the O-3 level. His attention was drawn to the flight deck by the loud explosion of an A-7 hitting the ramp. Because of his proximity to the mishap, he felt he might be of assistance in a possible firefighting situation. Donning his flotation vest and helmet, Airman Johnson hurried to the flight deck. Arriving at the scene, he observed flames scattered about the landing area and then sighted the mishap pilot being dragged aft on the angled deck by his parachute. He realized the pilot's imminent danger. Without regard for his own safety, PRAN Johnson raced between the pockets of fire and was one of the first to reach the injured aviator, who was barely conscious and entangled in his parachute. Johnson's knowledge of flight safety equipment enabled him to release the pilot from his parachute, torso harness, and seat pan and assist medical personnel in the pilot's expeditious evacuation from the flight deck.

PRAN Johnson's selfless actions in an extremely hazardous situation were authentically heroic. His knowledge of aviation safety equipment was directly responsible for averting further injury to the mishap pilot. PRAN David G. Johnson is commended for demonstrating the very best attributes associated with the term "shipmate."

Although Bravo Zulus are usually reserved for flight crewmembers who have accomplished an outstanding feat of airmanship, *APPROACH* is proud to award a Bravo Zulu for an act which helped save a shipmate's life. ◄

Z

ZULU

"First things first"

By LCDR Dave Wagner, USN
VAQ-133

I'VE always thought many of our safety incidents are due to minor abnormalities being given too much attention. Sometimes, we seem to let our innate desire for each function and black box in the aircraft to *purr as advertised* distract us from the real necessities of flying: altitude, attitude, and airspeed. Clear-cut cases of aircraft failure (fire, flameouts, etc.) normally dictate ejection as the only immediate solution. Situations which have degenerated from small incidents to *bona fide* emergencies sometimes make the ejection option less evident, thus possibly delaying or precluding ejection and, correspondingly, decreasing the survival odds.

Enough philosophy; some specifics may help to remind us not to get bogged down in minutiae when our attention should be focused on the basics of flying. Recently, following a normal day cat shot, an aircraft was seen to settle after level-off at 500 feet and then continue the climbout without further incident. At first glance, this would appear to be a minor abnormality of little consequence, but then, when incidents of this nature become significant, there are usually no survivors to analyze the mishap. It turned out in this case that the aircraft had an unsafe gear indication. The pilot noted the condition and reduced power to stay below gear speed. Flaps were raised accordingly at flap retraction speed. At about this time, the right seater got buried in the PCL reciting the gear unsafe *down* procedures. The pilot became doubly distracted due to: (1) the reading of a checklist, and (2) the reading of the *wrong* checklist. Due to the distraction, the increased settle caused by raising the flaps with less than normal power and related acceleration was not noted until "felt" by the pilot. A debrief of the incident

revealed: (a) that the specifics of this "emergency" had been briefed prior to the hop due to the history of the aircraft (in this case *fly the airplane, get altitude and airspeed, and then break out the research material*), and (b) that, of the three aircrew members, only the pilot recognized the settle. It doesn't take much review of history to find accidents at least hypothesized to have had a similar genesis. It's a vivid example of allowing oneself to become engrossed in a minor abnormality.

Another example. Say you're on a duty SSSC mission in low visibility with an obstinate radar causing excessive cockpit time to "tweak the gadget" combined with low altitude flying for identification purposes. In compiling and transmitting the contact information, it soon appears that one of the crew is not receiving ICS inputs. As a result, the communication circuits become clobbered with numerous ICS checks and UHF receptions. Problems like this are only stopped by a "silence" demand from the pilot and resolved after an orderly troubleshooting sequence has been conducted at altitude. Again, it's easy to lose sight of the basics when you're lost in a technological storm.

So what's the point? There are two general thoughts I offer to help avoid the trap of nonessential distractions. First, eliminate, through proper flight planning, briefing, preflight, postflight, and debriefing, as many potential distractions as possible. Know your mission cold – both as planned and as may be altered by exigencies. Look up and have available secondary frequencies, approaches, and charts prior to their being needed. Review the previous gripes on the aircraft, and write up gripes concerning any abnormal workflow in the cockpit, such as lighting problems and nonstandard switches. One of our aircraft, for example, had a rudder switch which was different – a constant distraction since it was normally found by touch during flights. The change stayed low on the maintenance system's priority list until correction was insisted upon by a pilot. The second, and possibly most important requirement, is cockpit discipline. Know exactly what should be warranting your greatest attention given both your flying regime and the abnormality being experienced. Keep first things first. ◄

A Volatile Situation

EVERY once in a while, even the most seasoned aircrewman from the VR *100,000-mile-plus* club will encounter a brand new situation during the execution of his logistic support mission. Such a "first" occurred recently on a routine passenger/cargo lift from NAS Southeast to NAS Furthernorth.

About 45 minutes after takeoff, a C-9B was cruising at FL310 in CAVU conditions. One of the flight crew was making a routine check of the passenger compartment when he became aware of a pungent odor permeating the cabin. He alerted the flight engineer, and a check of the passengers revealed the source of the fumes.

After attempting to paint her fingernails, a third class petty officer had upset a jar of fingernail polish and was attempting to clean up the mess with *acetone*! Needless to say, the polish remover was quickly capped, and "No Smoking" signs were expeditiously illuminated.

NAVSUPPUB 505, Chapter 6, is explicit in its definition of flammable liquids and handling instructions for these materials:

- Flammable liquid means any liquid having a flashpoint below 100°F (37.8°C).
- Flashpoint means the minimum temperature at which a liquid gives off a vapor within a test vessel in sufficient concentration to form an ignitable mixture with air near the surface of the liquid.
- Flammable liquids must be stored in cool, well-ventilated areas. They must not be stored near sources of heat, flames, sparks, combustible materials, or oxidizing agents. Containers must be tightly closed to prevent the evaporation of flammable liquid.

Some of the more common substances that fall into this category of flammable liquids are acetone (fingernail polish remover), cigarette lighter fluid, most cleaning fluids, paint (enamel, lacquer, shellac, varnish) and wood filler. If it is absolutely necessary to carry any of these materials aboard a transport flight, always ensure the container is tightly secured and no possibility exists for the volatile vapors to escape in the oxygen-rich environment of a pressurized aircraft cabin!

LETTERS
to the editor

Re: AUG '81 *APPROACH* Cover

NAS Norfolk, VA – As a long time reader of *APPROACH* magazine, I'm somewhat amused by your lack of quality control on your cover of the AUG '81 issue. Mr. Krug's painting is an excellent rendering, but it makes us old LSOs cringe. I refer to the lack of an oxygen mask on the pilot and the fact that he's gazing somewhere over toward the island rather than looking at the "ball." (Maybe it's station 3 MOVLAS?)

LCDR F. A. Roberts
AIRLANT LSO

● The painting depicts a company pilot flying a prototype aircraft with an oxygen system malfunction on a MOVLAS recovery. (If you buy that, we've got some land we'd like to talk to you about!)

"Ill-fated Cross-country"

Fairfax, VA – I read the article by R. A. Eldridge titled "Ill-fated Cross-country" in the JUL '81 issue of *APPROACH*. I found it very good until the last three paragraphs. If the cause of the accident was undetermined, where does the author get off giving poor judgment as one of the contributing factors?

It doesn't do any good to finish an article with a judgment that is unfounded. The last three paragraphs convict the crew without evidence. Weather and material failure would appear to me to be suspect before pilot error.

LtCol Daniel Keenan (Ret.)
FAA Aviation Safety Inspector

● While pilot error could not be conclusively proven as the cause of the actual crash, poor judgment on the part of the crew was clearly in evidence throughout the flight. The flight should have been terminated or postponed due to weather and equipment problems. Whether or not the failure to make this decision caused the mishap is conjecture; that it was very bad judgment is a fact.

On Heat, Salt, and Water

Cherry Point, NC – A recent WEEKLY SUMMARY included a statement advising personnel to ". . . try to 'load up' on both water and salt before entering a warm environment." Supplementary salt ingestion is recommended only for persons exposed to extremes of heat and humidity, and in those cases, medical supervision of salt intake is strongly advised. Due to the salt content of normal meals, it is preferable to eat regularly and well, rather than take additional salt. Salt tablets, while easily obtainable, are the worst method known to adjust the body's salt balance during acclimatization. Since they bypass the taste buds (a form of natural protection), it becomes easy to overdose on salt. This makes the body more susceptible to heat exhaustion and heat stroke, and increases the incidence of dehydration.

Many people believe salt is the only mineral lost through perspiration. Actually very little salt is lost. Potassium, the mineral used by the muscles to control heat buildup, is lost in great quantities and must be replaced. Supplemental potassium is found in fruits (such as bananas) and in fruit juices. Therefore, summer is *not* the right time to scrimp on orange juice.

A parting word is in order. Cold fluids are best for rehydrating. Contrary to popular belief, cold water will not make you any more susceptible to cramps than will warm water. Cold water will kill thirst faster than is desirable, however, so it may be necessary to force the water down. The increased motility of water or juice at 40°F (optimum) is the primary factor in determining the relative desirability of cold fluids. Note that water intoxication (or "water headache") can occur as a result of drinking too much water at one time. Two glasses are just about right to start rehydration. But the individual will require more after a brief absorption period. Food, such as fruit, sandwiches, or candy bars, can provide the required minerals to decrease the time required to balance this water intake and allow faster rehydration.

More information can be found in BUMEDINST 6200.7A, BUMEDINST 6260.2B, and NAVMED P-5010-3 (1974).

LTJG J. M. Etheredge, MSC

● A correction of the misinformation in the referenced WEEKLY SUMMARY was printed in the next issue of that publication. Because of the importance of this issue, however, we elected to run LTJG Etheredge's informative letter in *APPROACH*, as well. ◀

Contributors Wanted

APPROACH is always interested in contributed articles and photos. To save you time and increase the chances of your contribution being published, we have printed a Contributor's Guide. For a free copy of this handy booklet, please write to: Naval Safety Center, Safety Publications Dept. (Code 7531), NAS Norfolk, VA 23511 or call Autovon 690-1321.

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request. Address: *APPROACH* Editor, Naval Safety Center, NAS Norfolk, VA 23511. Views expressed are those of the writers and do not imply endorsement by the Naval Safety Center.

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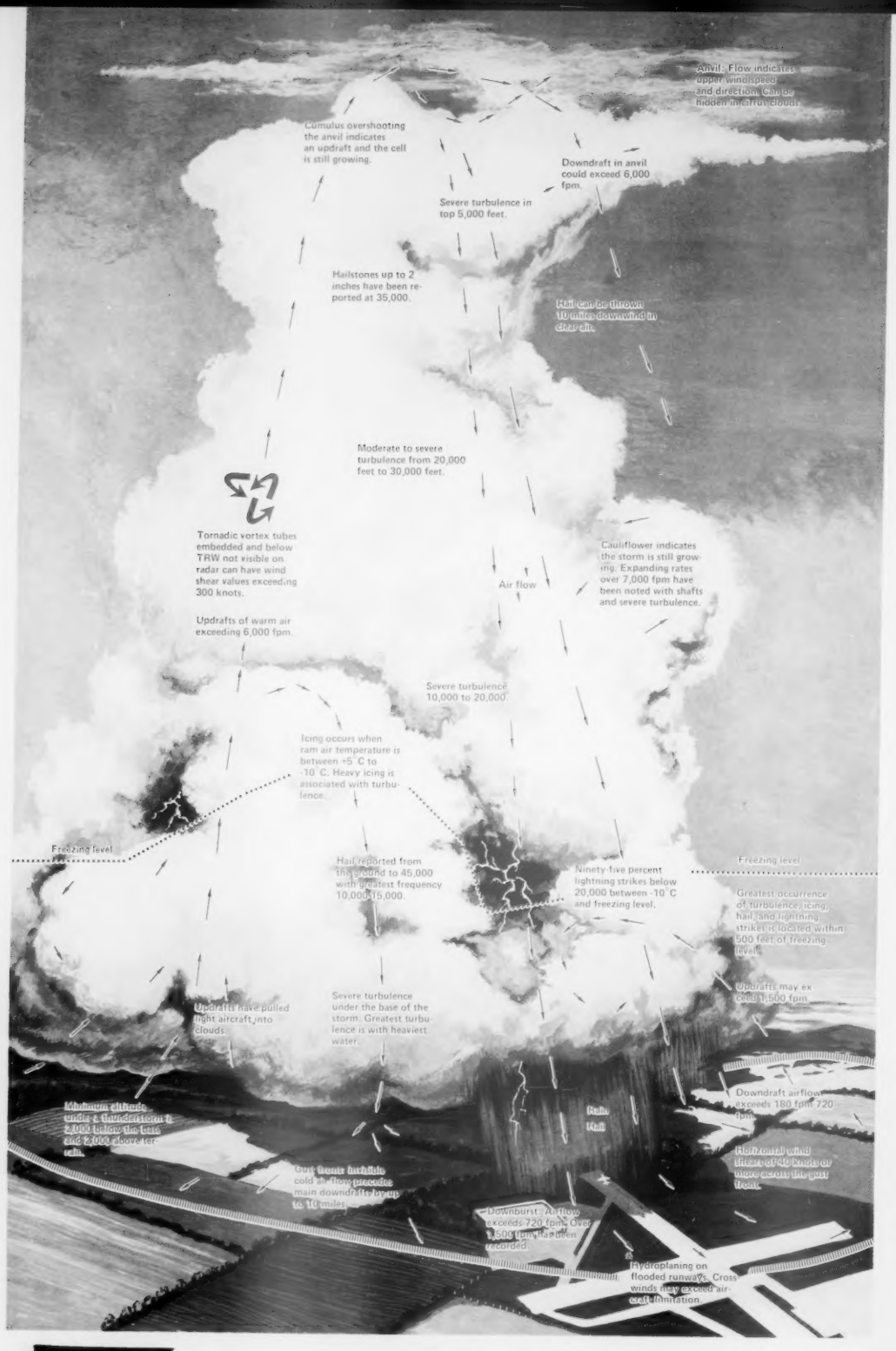
PILOTS BEWARE

FIELD ARRESTING GEAR CAN WIPE OUT YOUR BRAKES

Naval Safety Center
NAS Norfolk, Virginia

Poster idea contributed by AW1 Tedford, HS-74 Safety Department.


Anvil. Flow indicates upper windspeed and direction. Can be hidden in thunderclouds.
Cumulus overshooting the anvil indicates an updraft and the cell is still growing.
Downdraft in anvil could exceed 6,000 fpm.
Severe turbulence in top 5,000 feet.
Hailstones up to 2 inches have been reported at 35,000.
Hail can be thrown 10 miles downwind in clear air.
Moderate to severe turbulence from 20,000 feet to 30,000 feet.
Tornadic vortex tubes embedded and below TRW not visible on radar can have wind shear values exceeding 300 knots.
Updrafts of warm air exceeding 6,000 fpm.
Cauliflower indicates the storm is still growing. Expanding rates over 7,000 fpm have been noted with shafts and severe turbulence.
Air flow
Severe turbulence 10,000 to 20,000.
Icing occurs when ram air temperature is between +5°C to -10°C. Heavy icing is associated with turbulence.
Freezing level
Hail reported from the ground to 45,000 with greatest frequency 10,000-15,000.
Ninety-five percent lightning strikes below 20,000 between -10°C and freezing level.
Freezing level
Greatest occurrence of turbulence, icing, hail and lightning strikes is located within 500 feet of freezing level.
Updrafts may exceed 1,500 fpm.
Severe turbulence under the base of the storm. Greatest turbulence is with heaviest water.
Updrafts have pulled light aircraft into clouds.
Downdraft airflow exceeds 180 fpm, 720 fpm.
Rain
Hail
Horizontal wind shears of 40 knots or more across the gust front.
Gust fronts forward cold airflow precedes main downdraft by up to 10 miles.
Downburst. Airflow exceeds 720 fpm. Over 1,500 fpm has been recorded.
Hydroplaning on flooded runways. Cross winds may exceed aircraft limitation.

...a host of dangers.